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USSR Report

SCIENCE AND TECHNOLOGY POLICY

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ORGANIZATION, PLANNING AND COORDINATION

RED TAPE IN INTRODUCTION OF NEW FORCEPS FOR EYE SURGERY

Moscow IZVESTIYA in Russian 10 Aug 86 p 5

[Article by Ustin Malapagin under the rubric "Satirical Article": "Forceps for Argus"]

[Text] There are moments in life, when you have returned from work, have thoroughly dined, and now you sit, having become limp in an armchair, and relax. Pleasant thoughts pass through your mind, you are drawn to philosophize, to invent some law, or, if worst comes to worse, to solve a subtle little problem.

But all the same people were able in former times to invent such a puzzle in order then for centuries to rack their brains over it. Can the almighty create such a stone which he himself could not lift? How many legions of devils can fit on the end of a needle? What will become of Manya, when will Vanya get married?

The questions, as you see, are all not for our supersonic age. And, honestly speaking, to hell with them, with the devils. The problem of the forceps at the Kazan Medinstrument Scientific Production Association worries me far more than devils on a needle.

The point is that there they decided to produce new forceps for eye microsurgery, which are absolutely essential to eye doctors. And not only did they decide to, but they also produced prototypes, at the sight of which the eye of the ophthalmologist lit up with hungry surgical fire.

However, soon the eye had to be extinguished: without the appropriate approval an ordinary prototype will never get the stripes of an equal series-produced instrument.

What do you think, who has the right to judge precisely which instruments eye doctors need? What should forceps be like? Why precisely forceps, and not, say, a cork screw or fireplace tongs? Of course, you will say, only those for whom these instruments are intended--ophthalmologists. Quite correct! The answer, as they say among ophthalmologists, is well aimed. And, to the honor of our eye doctors, we can proudly say that among them there are such stars of the first scientific magnitude as A.P. Nesterov, M.M. Krasnov, S.N. Fedorov,

and others. They know exactly not only how to perform an operation, but also with what to perform it. This is on the one hand. On the other, there exists in Kazan the Medinstrument Scientific Production Association, a world-famous firm, which is capable of producing an instrument for implanting an artificial lens in a near-sighted flea. It would seem that without eyeglasses it is clear that the direct creative and business contact of these two colossuses of professionalism will be a landmark in eye microsurgery. Is it logical?

And instruments were actually obtained--you would not tear out the eye. This, incidentally, is witnessed not only by the opinions of domestic specialists, but also the letter of L. Shepence, president of the association for the study of medical instruments of the United States, who wrote to Kazan that "this--without a doubt--is an excellent instrument," and offered his services as an agent for the sale of Kazan instruments in the States.

Do you think that in Kazan they seized the flattering offer? In Kazan they clutched their head. For in order to convert the illegitimate experimental forceps to a legal series-produced status it is necessary first of all to draw up a technical assignment and the technical medical requirements for experimental design work.

Personally this document astonished me. Imagine a work on 19 pages, which has been typed and in which it is necessary to answer approximately 300 questions. "What kind of head or if only an executive staff is it necessary to have in order to fill all this out?" I was astonished, but, having looked into it, I understood that many truths and questions are entirely within my power.

Take, for example, Paragraph 1.1. "The eye microsurgical forceps (hereinafter the forceps)," it is stated in it, "are intended for the holding of tissues during the performance of microsurgical operations on the eyeball. The field of application is ophthalmology." This is clear. It is not to weed flower beds and not to hold the tissue of a graft of a "pipin-saffron" apple tree. Or Paragraph 7.5.1: "The design of the forceps should be safe in use both for patients and for the attendant during an operation." It is good that they gave notice, or else, I am afraid, the Kazan developers will design crossbow forceps with a dual tipping carriage. When I read Paragraph 7.1, which says that "the design of the forceps should be technologically feasible in production," it was as if scales had fallen from my eyes. I understood that this paragraph was invented not at all in order to give the country an above-plan Kirovets tractor from the metal saved on the forceps (the approximate need for the forceps being developed for the first 5 years of commercial production is 200 units with a weight of one set of forceps of not more than 15 grams), but so that the Kazan production cobbler would stick to his last and would fear casual production relations.

But so that the people of Kazan would not be left with any doubts about in whose hands the ophthalmoscope is, 15 signatures and official stamps (of them 11 are from Moscow) were placed on the cover of the assignment.

Have you ever gotten an official stamp from the chief of a main administration? What about from a deputy chief? Well if only from a chief specialist? Did you not get it? And I will not give advice. As they say

among ophthalmologists, eyes on the forehead--now what a little job that is. But what if it is 15 times on the forehead and back again? No sooner have you succeeded in getting the director of the VNIIIMT of the Ministry of Health to sign, and you look--before you is the deputy chief of the Therapeutic and Prophylactic Aid Main Administration. He only has to sign his name, when here the deputy chief for the introduction of new drugs and medical equipment springs up. In his life he, perhaps, has not held and will not hold these forceps in his hands, but without his signature you will not make the forceps. Only two of those who put their signatures on the assignment had a direct bearing on the instrument--the producers from the scientific production association and Professor A.P. Nesterov, who when performing an operation liked the forceps. And one eye of each of those, who placed a stamp on, agreed to, and approved the assignment, was on you, while the other was on the ministerial order, which regulates similar gathering of official stamps. And behind each official stamp there are business trips to Moscow, lines at the hotels of the capital, the catching of the mood of the person who carries the official stamp, the consideration of the phase of the moon, the position of the planets, and the designs of fate, which, according to the assertion of eastern ophthalmologists, is inscribed by a microneedle in the corners of the eyes of orthodox dispatched people.

I no longer know whether to continue or to speak about something pleasant. After all, having approved the assignment and having produced models, after this the production workers should have submitted the program of technical tests to the client for approval. But this--how bad it is--is another 12 official stamps! Then one has to conduct these tests at not less than three clinics and to obtain the opinions of those, for whom the forceps were made. Then one has to witness the signature of the tester of the model, after which one has to send all the documents plus a photograph of the forceps facing front and in profile together with a patent blank for the consideration of a specialized commission of the USSR Ministry of Health. Then....

I beg you, we had better return to Paragraph 7.3.1 of the assignment, which says that "the forceps should be technologically feasible in production." But what about in case of approval? But what about in case of coordination? How is it possible to think about a kilogram of incompletely used metal and to throw systematically to the wind hundreds of hours of expensive working time? Why when getting agreement on an instrument, which in general is simple, do as many workers get together as devils on the point of a medieval needle? But perhaps they are not busy? Or not very busy? Or busy with the wrong thing? How is one to otherwise explain that 90 days, in accordance with All-Union State Standard 15.001-73, are given to the 6 organizations which are reaching an agreement, from 3 to 6 months are spent on obtaining the extract on the approval of the forceps and the order on recommendation for production? Why was the patent research hung on the same designers? Why does the USSR State Committee for Standards check the quality of the drawings, but not the quality of the products being produced? Is it not time to send this 100-eyed Argus for treatment for organizational near-sightedness and innate bureaucratic strabismus?

It seems that I have stolen right up to the discovery of the law of the applying of official stamps. I propose the following wording:

"The degree of official risk is equal to a fraction, in the numerator of which there is responsibility, while in the denominator there is the signature of the person who bears this responsibility. The more signatures there are, the less responsibility there is on the bearing unit. As the number of official stamps approaches infinity, the degree of personal responsibility steadily tends to zero."

And given any vision it becomes obvious that the matter needs such signatures like a log in the eye.

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CSO: 1814/253

FACILITIES AND MANPOWER

ROLE OF SCIENTIFIC PRODUCTION ASSOCIATIONS IN S&T PROGRESS

Moscow IZVESTIYA in Russian 19 Aug 86 p 2

[Interview with Corresponding Member of the USSR Academy of Sciences Viktor Petrovich Belyakov by IZVESTIYA science commentator B. Konovalov under the rubric "New Equipment: From the Idea to the Series": "On 'Three Whales.' An Interview With Corresponding Member of the USSR Academy of Sciences V.P. Belyakov, Organizer of the First All-Union Scientific Production Association in the Country and General Designer of Cryogenic Equipment"; date, place, and occasion not given]

[Text] [Answer] "Today pretty often," Viktor Petrovich says, "in the press and on radio and television you hear from scientists: we have developed a fine prototype, but industry is not putting it into production. Indeed, in our country, as a rule, 10-12 years now pass from the start of development to the organization of series production. And when new equipment enters the national economy, it is already becoming obsolete."

[Question] "Where, in your opinion, is the root of evil?"

[Answer] "In the separate existence of sectorial science and production. Moreover, by science I mean both the scientist and the designer. In our country, unfortunately, they each often work independently. But this is no good at all. Alone a scientist can successfully conduct a study, write an article, and defend a dissertation, but all this will be merely a 'paper result.' Alone a designer can design new equipment, but without the guarantee that it will indeed be advanced. Only when scientists and designers work together, can they develop equipment at a high world level.

"But this is too little. It is also necessary to organize series production. It is here, at the meeting point of science and production, that a strong barrier now stands. And not because of the stagnation of industry, as they often say, but owing to objective factors. In case of the separate existence of science and production new equipment is contemplated at institutes and design bureaus without looking at the real potentials of plants. But it is difficult to alter plant technology. This requires time, new equipment, and specialists. Therefore, when they include the production of new equipment in the plan for a series-producing plant, it cannot allow itself 'to have its head in the clouds,' but should base itself on reality and, as a rule, is

forced to alter the prototype radically. It is good if it has its own strong design bureau, but when it does not, this is the upsetting of the plans."

[Question] "But now the policy of the integration of science and production and the establishment of scientific production associations has been adopted in the country. You, Viktor Petrovich, were yourself one of the initiators of this matter...."

[Answer] "Yes, at first I was for 3 years the director of the All-Union Scientific Research Institute of Oxygen Machine Building. The nearby Balashikha Plant of our Ministry of Chemical and Petroleum Machine Building, which was intended for the series production of cryogenic equipment, did not take our developments, and we actually worked 'for the shelf,' as did the majority of institutes. In 1972 at our suggestion the Kriogenmash Scientific Production Association was organized. The institute and plant merged and began to live under a common management, the party and trade union organizations were unified. And gradually owing to the reorganization of all the work we became a unified whole. Now from the very start of the development of our equipment, in which very low temperatures, including temperatures close to absolute zero, are used, institute scientists and designers work in close contact with plant specialists.

"For example, when we existed separately, the plant did not accept designs from us, if the welding of aluminum was envisaged there. After the organization of the scientific production association we sent our welders to the plant and enlisted specialists of the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences to develop the technology and to devise the necessary equipment. And things began to move. Now we always prepare the plant in advance for the output of new equipment, back before the delivery of the drawings.

"But the trouble is that at the majority of scientific production associations the unification of science and production occurred purely mechanically, without the radical organizational reform of the work, and, in essence, they exist as before and live separately in accordance with their stereotypes. Many scientific production associations are such only in name--they have a low-capacity works. Wherever there are series-producing plants within the scientific production associations, the institutes gradually lose their character, turning in essence into an 'appendage' of production. For the indicators of work are now planned for the scientific production association as an ordinary industrial enterprise. You will not encounter such an indicator as the scientific and technical level of products. The very economic conditions at present scientific production associations place production in the forefront. But this is incorrect. Science and production are obliged to work in a single team, and science should be without fail the 'shaft horse.' Industry, after all, in itself is objectively not interested in replacing a developed product with a more economical and efficient one."

[Question] "What do you suggest in order to change the formed situation?"

[Answer] "To intensify and extend integration--to establish all-union scientific production associations (VNPO's), which would unite in accordance

with their type all the series-producing plants of the country, while a main institute and a general designer, who is personally responsible for everything--from the start of development to the organization of mass production--would be at the head. At a recent conference in the CPSU Central Committee I said that this is not simply a speculative suggestion--the first experience already exists. The Kriotekhnika All-Union Scientific Production Association, in which all the former scientific production associations and plants, which operated in this sector, were merged, has been established in the Ministry of Chemical and Petroleum Machine Building.

"Our Kriogenmash Scientific Production Association, which produces approximately half of the cryogenic equipment with respect to the volume and range, became the main organization. In addition to it, the Odessa Kislorodmash Scientific Production Association, the Omsk Mikrokriogenmash Scientific Production, in which the Omsk Plant of Oxygen Machine Building was included, the Moscow Geliymash Scientific Production Association, and the Sverdlovsk Plant of Oxygen Machine Building became a part of the all-union scientific production association.

"The all-union scientific production association made it possible to unite the merits of all its components and to eliminate the shortcomings which are inherent in them individually. At the Odessa Scientific Production Association there is a good technological institute, but the research and design sections are poorly developed. At the Geliymash Scientific Production Association there is a low-capacity pilot works. At the Omsk Scientific Production Association there are few designers and no researchers. In Sverdlovsk there was no science and a weak design bureau. Now within the unified all-union scientific production association we can strengthen the weak links due to the fact that the strong subdivisions will work for everyone. Given such a number of scientific design and technological subdivisions we can solve a broader group of problems and pursue a unified technical policy at all the plants which produce cryogenic equipment. This is making it possible to use standardization extensively. While the experience of Kriogenmash showed that in any new equipment it is possible to use up to 80 percent standardized series-produced assemblies and parts. The management of our entire subsector from a single center will provide an enormous saving of human labor and material resources."

[Question] "Do you mean to say that in the structure of management the all-union scientific production associations will replace the former ministerial VPO's--all-union production associations?"

[Answer] "Not entirely. Although VNPO and VPO sound very similar to the ear, there is a fundamental difference between them. The all-union production associations were simply a superstructure, an intermediate unit between the scientific production association and the ministry. In essence, they performed the role of 'go-getters.'

"The all-union scientific production association is assuming a portion of the functions of the administrative management of the sector, but its main task is the implementation of an effective scientific and technical policy, in order to supply at the world level series-produced equipment to all its users and to

deliver it 'turnkey' upon the achievement of the indicators stipulated by the contract. For this the general designer and the departments of the main institute should monitor the themes of all the subdivisions under their care, the range of items being series produced, and their scientific and technical level.

"In the Ministry of Chemical and Petroleum Machine Building this idea received recognition, and now all-union scientific production associations in several other sectorial directions, as well as territorial ones are being organized following our example. In my opinion, it is also time for other ministries to begin the establishment of their own all-union scientific production associations. This would be of enormous benefit to the country. In particular, the need for sectorial science would decrease. Up to now on this level as well we have taken the extensive path, increasing all the time the number of scientific research institutes and design bureaus. But it is impossible to establish them at every plant."

[Question] "But do the general designer and the general director of the all-union scientific production association have enough rights to carry out the effective management of the sector?"

[Answer] "Quite extensive rights are granted to the general designer by the USSR Council of Ministers. But it is necessary that the ministries would recognize these rights in practice and would not ignore them, by managing in the old way. And, of course, it is necessary to decrease drastically the number of reporting indicators and to give great independence to the associations. Although a decree on the reduction of reporting has been adopted, it is being implemented slowly. Our economists have also been working for a long time now on Saturdays, while barely coping with the numerous reports. For a report with respect to hundreds of indicators is required of us. But why? In my opinion, there should be only four reporting indicators: the profit, the fulfillment of the plan with allowance made for contractual obligations, the scientific and technical level, and the quality of products. All the other indicators should be only internal, and the all-union scientific production association itself should decide how many and which ones it needs."

[Question] "If we summarize the stated ideas, you are proposing to establish new national economic units which would be supported by 'three whales'--scientific research, design and technological development, and the series output of products. But should the structure of the top levels of management then also be changed?"

[Answer] "Yes. This question became urgent long ago. Now scientific production associations have been recognized by everyone. But do you see how they live and are managed? Each of the parts--science and production most often--is individual legal entities, with its own system of remuneration and the payment of bonuses. The scientific design and technological subdivisions are grouped with the sector 'Science and Scientific Service' and are managed by the USSR State Committee for Science and Technology. While the sphere of production is under the jurisdiction of the USSR State Planning Committee.

"The Bureau of the USSR Council of Ministers for Machine Building has now been organized in our country. Administrations and a scientific and technical council, which encompass the problems of all 11 machine building ministries, have been established.

"I do not presume to judge other groups of ministries, but for the machine building ministries the establishment of this bureau, in my opinion, made unnecessary the management unit in the form of the State Committee for Science and Technology. For its responsibility is limited only to the stage of the development of the prototype. But the national economy needs not them, but new series-produced equipment. The Bureau of the USSR Council of Ministers for Machine Building is responsible for everything--both development and series production. I believe that it can successfully manage both the sectorial ministries, in which all-union scientific production associations will become the basic unit, and independent intersectorial all-union scientific production associations, which it is also necessary to establish. The interbranch scientific technical complexes, which are now being organized in the country, are aimed at the development of prototypes. In my opinion, this is a compromise solution."

[Question] "All the same one can see a fly in the ointment which the establishment of all-union scientific production associations promises. Your Kriotekhnika will become a monopolistic developer and producer, there will be not competitors. But starting with the new year your all-union scientific production association, just as the entire Ministry of Chemical and Petroleum Machine Building, will change over to self-financing, when the profit will become a very substantial stimulus. Under these conditions the group interests of the all-union scientific production association or the ministry might differ from state interests. Recently after one of our publications IZVESTIYA received a letter from Academician G.S. Pospelov. He warns that a self-financing sector might scorn state interests, as happened at one time with the Ministry of Instrument Making, Automation Equipment, and Control Systems, which changed over to self-sufficiency. By playing with the prices for watches and jewelry and developing enterprises accordingly, the Ministry of Instrument Making, Automation Equipment, and Control Systems actually became fully self-sufficient. But in so doing the ministry 'wrecked' scientific instrument making. Does not such a danger also await you in the direction of self-financing?"

[Answer] "The question is of great importance. In my opinion, 'hidden rocks' exist. The output of series-produced equipment might suppress the production of several types of new equipment, if it is not specially stimulated.

"The policy of the State Committee for Prices has already now made, for example, the production of custom-made cryogenic units economically unprofitable for us. During the past five-year plan the State Committee for Prices twice changed the methods of the pricing of cryogenic equipment, and we lost on this many millions of rubles. In our pricing libertarianism now reigns instead of a scientifically sound approach. Suffice it to say that the State Committee for Prices has legalized four methods of the pricing of the cryogenic equipment we produce! Planning and pricing should become a unified whole and not exist separately.

"As to the monitoring of the activity of the all-union scientific production association which operates under the conditions of self-financing, in my opinion, the users of the products should carry it out. For self-financing is not an isolated process. At the same time a changeover to work in accordance with contractual obligations should occur. The contractual relations between the client and the consumer should become decisive in economic life. We are already operating in accordance with this system. The client gives us the parameters of the units which he would like to have. Together we draw up the technical assignment and conclude a contract for its fulfillment. If we were to refuse to accept an order or not to meet our obligations, this would serve as grounds for the intervention of state organs. For the present we are invariably meeting our obligations and are delivering our systems 'turnkey' to clients in completely serviceable condition.

"If we speak of the Ministry of Chemical and Petroleum Machine Building as a whole, I will recall that it now has an immediate monitoring organ--the Bureau of the USSR Council of Ministers for Machine Building, which is called upon to protect state interests and has all the rights to correct the situation, if the need arises. So that both economic and administrative levers of management exist for our organizations which are embarking on the path of self-financing."

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REASONS FOR, REACTIONS TO CLOSING OF GIPRONIIMASH

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Aug 86 p 2

[Article by Ye. Leontyeva, deputy editor of IZVESTIYA for the Science and Technical Progress Department: "The Institute Has Been Closed. Science Has Not Suffered"; first five paragraphs are IZVESTIYA introduction]

[Text] I walk through the corridors and laboratories of the institute which no longer exists. Someone is still sitting determinedly over documents. The other workplaces are empty. But the majority continue to discuss intensely what had happened: Why did they close their GiproNIImash?

"A complete surprise for everyone," L. Bronnikov, former director of the institute, tried to persuade me. "So far I do not understand what the matter is...."

"The commission, which checked our work, took a biased approach," A. Zaytsev, former deputy for the scientific section, echoed him.

"There were no grounds for the categorical conclusions which it drew," V. Lomonosov, former secretary of the party buro, believes.

I had occasion to hear many, oh how many similar opinions: both "a cold shower" and "a bolt out of the blue." The diagnosis named in the decree of the USSR Council of Ministers--scientific fruitlessness--was the greatest surprise for the staff members of the GiproNIImash.

If we sum up the impressions, two opposite points of view appear in contrast. It is possible to present the first of them in the form of a monologue, although there is an entire chorus of voices in it.

"Our collective was always notable for amazing unity: everyone willingly helped each other and worried about the fulfillment of the plan. There was practically no turnover of personnel: people, if they did leave the scientific research institute, did so mainly in connection with moving or for a higher wage and position. There were no unauthorized absences from work. The comrade's court and the commission for combating drunkenness existed only formally owing to the lack of 'cases.' The moral climate is good: there are neither rows nor squabbles. The practical return of developments? An

impressive one: 3.5 rubles per ruble of expenditures. The collective repeatedly received incentives for good work. It held leading places in Leningradskiy Rayon of the capital. During the past five-year plan it was twice the leader in the socialist competition at the level of the ministry and the central committee of the trade union of the workers of the sector...."

It is a worthy reference, is it not, for an institute of the first category, which the GiproNIImash was? And, what is interesting, everything in it is correct. Except, perhaps, one figure.

But here are the conclusions of the commission of the State Committee for Science and Technology. In the past 9 years not one license was sold at the institute. The developments completed by it do not conform to the achieved world level. Of the total economic impact 95 percent is conditional, while the real practical return during the past year came not to 3.5 rubles, but to only 18 kopecks per ruble of expenditures.

Why do the conclusions of the commission absolutely not agree with how the Ministry of Instrument Making, Automation Equipment, and Control Systems evaluated the work of its institute? And with the self-evaluation of the collective? The whole point is that it proceeded from the tasks which were set for this scientific research institute at its establishment. While they were of truly enormous state importance.

The GiproNIImash was established as the only institute in the country, which was called upon to elaborate the problems of the economics and technology of specialized intersectorial works. By means of them it was planned to put an end to the present destructive practice, when the majority of machine building enterprises have their own foundries, their own forges, and other blanking shops. Due to the small production volumes in them it makes no sense to install high-performance equipment, to use advanced technological processes, and to engage in complete automation. Therefore, many of the small shops of this sort had already become long ago a burden for the economy of the enterprises.

The idea of intersectorial works, which it was proposed to establish in each large industrial region, also originated in order to get rid of it. The GiproNIImash, which 20 years ago was subordinate to the Ministry of Instrument Making, Automation Equipment, and Control Systems, should also have engaged in their development.

How did it engage in this? As the commission established, during the time of the existence of the institute its workers did not conduct one serious economic study.

But did the staff members of the GiproNIImash, perhaps, do much in the area of technology--for at specialized intersectorial works it should be the most advanced and highly efficient? But here, too, the commission noted that obsolete solutions and equipment were frequently incorporated in the designs. While the attempts to break away from the captivity of routine frequently ended in embarrassment. For example, the development of a pilot technology of the hardening and the finishing to final dimensions of gears made of metallic

powders was included in the thematic plan for 3 years. And each year the institute reported...on its fulfillment, without having forgotten to indicate the anticipated economic impact of 75,000 rubles.

As we see, the collective obviously did not cope with the intersectorial tasks which were set for it. With what did it deal in such a case? It mainly worked on special problems of the enterprises of its sector, gave them technical assistance, and was "on the take" of the ministry and three of its all-union production associations. And, of course, it performed planning work--here they like to engage in this most of all: previously the institute was a purely planning one, and, in essence, it also remained such.

Then what instilled in its workers confidence in their usefulness and correctness? How did it happen that in case of such-and-such a job they also did not even admit the thought of the present outcome? First of all, of course, the years-long habit of glossing over the shortcomings and exaggerating the achievements had an effect. But the stand of the Ministry of Instrument Making, Automation Equipment, and Control Systems played the main role: by using the institute for its own purposes, it also approached the evaluation of its activity with its own departmental "yardstick," which proved to be much shorter than the state yardstick.

In order to be convinced of this, it is sufficient to gain access to the kitchen of the creation of the economic impact. Poorly substantiated data were made the basis of its calculations, while the results were approved by the management without consultation with the client. The work on the calculation of the actual impact could not have been carried out worse. And why take the trouble, when they had become accustomed here to passing off the conditional as the real? So that is how the 3.5 rubles per ruble of expenditures, which when it came to the test turned out to be 18 kopecks, was obtained. And they got completely away with everything, creating in the collective an atmosphere of complacency and even friendly solidarity, when one is for all and all are for one.

But were there also in the collective those who understood what was happening and were able to properly evaluate it? There were, but why did they prefer to remain silent? Here is what I. Ratner, former head of a department of the institute, says on this account:

"There was not enough adherence to principles and civic boldness...."

Yes, it is probably simpler and easier to live with adherence to principles, which is hidden in the pocket. And they even developed for themselves a justificatory philosophy: "It was, they say, not in our power." But V. Lomonosov, secretary of the party buro, even extended the idea:

"We in essence are dependent people. The ministry should aim science in the necessary direction, and if it did not, what do we have to do with it?"

Let us leave on the conscience of the scientific associates their "philosophy." But, indeed, they lived not in isolation and turned aside not under the cover of night, while abandoning the main work. In the Ministry of

Instrument Making, Automation Equipment, and Control Systems there is an administration for the coordination of the production of products of general machine building application. Its very name testifies that it was born with the same purpose as the institutes subordinate to it.

It was conceived as follows: an interdepartmental structure, without which it is impossible to raise machine building to a modern level, should operate within the department. For the last 2 years B. Titov has been in charge of the administration. Prior to this O. Spasskaya headed it for many years. I spoke with both. And so what? The reaction to the decision to close the institute is the same as at the GiproNIImash.

"The institute is like an institute. Perhaps, it is no better than others....but it is also no worse!"

True, Titov still noticed one "small shortcoming."

"In the amount of work," he said, "the institute was reminiscent of a department store. There is much of everything and everything is as if needed."

Yes, the comparison is appropriate. But this shortcoming to a great extent should be attributed to B. Titov himself: the formulation of the plan took place mainly on the basis of the instructions of the administration and the ministry, which demanded that grist be brought to their, the sectorial mill.

The instructions multiplied. In conformity with them the number of small subdivisions, for which serious problems were too hard, increased at the institute. But then, when the time came for the collective to report back, the ministerial workers displayed, to put it mildly, leniency and shut their eyes to much. So that not by chance was the unsatisfactory management of the institute on the part of the headquarters of the sector pointed out to former minister B. Balmont in the decree of the USSR Council of Ministers.

Incidentally, the history of the GiproNIImash is merely a graphic illustration of the ancient practice of the Ministry of Instrument Making, Automation Equipment, and Control Systems. They charged it more than once with the accomplishment of intersectorial tasks. And nearly always--whether it was a question of the establishment of Tsentrolits, the mass production of hydraulic systems or industrial robots--the ministry tried first of all to meet its own needs. This "strategy" also left its mark on the activity of the institute.

Here it is appropriate to ask a question: But where was the USSR State Planning Committee, which was also charged with the establishment of specialized enterprises for the output of general machine building products? And why did the USSR State Committee for Construction Affairs obviously not display the proper demandingness on the designs of intersectorial works, which were submitted by the institute? Finally, did the workers of the State Committee for Science and Technology really not see that the GiproNIImash was evading the accomplishment of the tasks which were set for it? All these committees were at the cradle of the idea of intersectorial works, but were never able to set the "child" on his feet.

It is easy to weigh the costs of such a practice. According to estimates of specialists, in case of the development of intersectorial works to the advisable level it would be possible to free 1 million (!) workers, to decrease the product cost, and to reduce the amounts of construction. Thorough research, modern designs, and the close cooperation of specialists of various sectors in the complete supply of shops are needed in order to force these reserves to work. The sad lesson of the GiproNIImash automatically suggests a conclusion: intersectorial tasks must also be accomplished on an intersectorial basis.

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SCIENTIFIC, TECHNICAL CENTER OF AVTOVAZ ASSOCIATION

Moscow IZVESTIYA in Russian 20 Aug 86 p 2

[Interview with Vladimir Vasilyevich Kadannikov, first deputy general director of the AvtoVAZ Association and director of the scientific and technical center, by IZVESTIYA correspondent E. Kondratov: "Do Not Catch Up, But Surpass! The Scientific and Technical Center Seeks Gifted People"; date, place, and occasion not given; first paragraph is IZVESTIYA introduction]

[Text] At the recent conference in the CPSU Central Committee, at which the questions of the radical increase of the technical level, quality, and competitive ability of the machines and equipment being produced were discussed, it was stated: the managers of those collectives, which have begun the organization of their own scientific and technical centers, are acting properly. Such centers have been established at the AvtoVAZ Association and a number of others. We are publishing the interview of our correspondent E. Kondratov with V. Kadannikov, first deputy general director of AvtoVAZ and director of the scientific and technical center.

[Question] Vladimir Vasilyevich, the letter of the workers of the Volga Motor Vehicle Works, in which they set forth their program of the development of scientific and technical progress, having declared that they intend to shorten the time of the assimilation of new base motor vehicles from 8 to 5 years, is still fresh in the memory. This, of course, is real acceleration, and everyone understood that it would not be easy for the collective of the Volga Motor Vehicle Works to achieve it. But barely more than a year has passed, and we are learning that the workers of the Volga Motor Vehicle Works are promising to shorten the time of the development of new base models from 5 years to 1 year. Some kind of fantasy....

[Answer] It is a great deal. A reality. True, not of today, but of the not very distant future. But one ought not to confuse the two different tasks: the development of a new vehicle and its mass production. The aims of AvtoVAZ have not changed--a new base model of a motor vehicle should go on line once in a five-year plan. But how good will it be? At the meeting of M.S. Gorbachev with the workers of Togliatti, which is memorable to all of us, the workers of the Volga Motor Vehicle Works heard a just reproach with the aspiration merely to stay at the level of the world automotive industry, and not to come out among its leaders. Thus, the idea of establishing our

scientific and technical center also consists precisely in the fact that the base models, which once in a five-year plan will go onto the conveyor, would be of the highest quality and would surpass by their merits all other vehicles of foreign firms. Of the five new vehicles, which during the five-year plan will originate at the scientific and technical center, one--the best one, which included all the advantages of the other four--will go on line. And in the very process of production it will be continuously improved.

[Question] However, the collective of the scientific and technical center will not only devise new models of vehicles, but will also produce them. What kind of technical base will it have for this? And in general what are the structure of the scientific and technical center and its status?

[Answer] At first our center will in reality be one of the plants of the association. In the West similar subdivisions--so-called engineering firms--exist within Fiat, Volkswagen, and other giants of the automotive industry. The practical task of the center is to issue detail designs of the production of new models of motor vehicles. Here the components of the new vehicles and engines will be developed and the materials of the technology and the equipment, which is needed for the production of the vehicle, will be selected. The scientific and technical center will turn the complete detail design over to the motor vehicle works for introduction in mass production. It will take place under our designer's supervision--any change in the detail design should be submitted for approval to the scientific and technical center. But before that at our pilot industrial works we will annually make 3,000 new vehicles and 10,000 engines.

Now about the structure of the scientific and technical center. The design and research building will be its largest and, undoubtedly, main subdivision. Its purpose is: the development of new components, design work, research, and the selection of the optimum technologies and materials. The design center with a climatic chamber and a wind tunnel will deal with the exterior of the motor vehicle and the development of the most advanced shapes of new vehicles. The complex of road tests....explanations, indeed, are superfluous here. It is anticipated that 5,500-6,000 people will work at our scientific and technical center, of them approximately a third are designers.

[Question] As far as I understand, your center needs not simply experienced, conscientious workers, but first of all creatively thinking people. If you wish, an engineering elite. From where will you recruit so many of them? Will you skim the cream from AvtoVAZ?

[Answer] Only in part. A portion of the personnel of several administrations of the Volga Motor Vehicle Plant--the administration of the chief designer, the planning administration, the administration of laboratory research operations, and several others--are being turned over to the scientific and technical center. However, only those, who have engaged in long-range development and not in the solution of vital production problems, will come to us. The second source of personnel is young specialists and graduates of institutes, the third is the hiring of designers, engineers, and industrial designers "on the side." Moreover, we will vigorously engage in the training of personnel for the future: we will send to technical higher educational

institutions as plant stipend holders school children who in the upper grades do practical production work at the Volga Motor Vehicle Works.

[Question] And the criteria of selection?

[Answer] The main one is the ability of a person to think creatively. Many letters and applications with requests to be hired are already now coming addressed to the scientific and technical center. We are studying the questionnaires and labor books, but an interview will be decisive for the candidates. We are relying on young people, their enthusiasm, and their healthy ambition. It is proposed to make competitive many positions at the scientific and technical center, including the chiefs of the divisions for chassis, engines, materials, and others. We want to reserve the right to cancel the contract with a specialist, if he does not correspond with respect to the manner of his thinking to the work in which he is engaged, we are seeking throughout the country sharp minds and gifted people. We have an especially urgent need for boldly thinking industrial designers. It is bad that in the country they are training them practically nowhere. But without professionals of automotive design it is difficult to develop a vehicle which could surpass foreign vehicles.

The future of the Volga Motor Vehicle Works depends on the successes of the scientific and technical center, but a miser, as is known, pays twice. The association will finance the center until it gets on its feet. Here there is a direct analogy with parents and children. In order to increase the competition, here even the salaries will be higher than plant salaries. The bonuses will accordingly also be higher. Half of the bonus fund will be used to give staff members incentives for their participation in the fulfillment of some common jobs. While the other half will be used for individual and group stimulation. The material incentive system itself at the scientific and technical center will presume the payment of bonuses for any appreciable display of creativity--for fresh ideas, which are confirmed in pilot industrial production, for innovations, which have received a patent, for unusual developments and effective changes of the themes of work....

The more brilliant minds we are able to attract to our problems, the sooner we will approach the goal--the development of the ideal motor vehicle.

[Question] Excuse me, Vladimir Vasilyevich, but what specific content are you putting into this concept--the ideal motor vehicle? How do you see it and with what do you intend to compare it? As far as I have understood, several years will be needed for the scientific and technical center to fully develop its activities. But in this time much water will have flowed under the bridge--for the world automotive industry also will not mark time. The criteria will inevitably change, just as fashion, and what seems good today, tomorrow will prove to be obsolete.

[Answer] I do not agree. The basic demands, which are made on a motor vehicle, are constant. It should be most safe, extremely economical, least harmful to the environment, and, of course, good-looking. But this parameter is very variable, since time itself forms the tastes of motorists. As to the

first three demands, in the foreseeable future no changes will occur here. The means of achieving these goals, and not the goals themselves, will vary. So that in general we have a clear idea of our program--it is based on the demands, which are dictated by technical progress, below the threshold of which our motor vehicles should not be. Today we know what kind of motor vehicles will be popular on the world market both in 1987 and in 1990, just as we know what is being done now in the world of the automotive industry for the increase of the reliability of the motor vehicle and the decrease of noise, toxicity, and fuel consumption. In order to be constantly in the know about technical progress, it is proposed to purchase each year up to 20 of the latest passenger cars, which have received high ratings in motor vehicle showrooms and on the markets, as well as 200 different assemblies which contain innovations. The designers, process engineers, and economists of the scientific and technical center will subject them to careful study. In order to establish our own reliable base for the development of the best motor vehicles, we need to know very much.

[Question] And once again I will repeat: the evaluations "better" and "worse" are very relative, while the motor vehicle itself does not exist. All the same its main examiner is use. But until it comes to it....

[Answer] But we will speed up this process of presenting evaluations! Of the 3,000 new motor vehicles, which our pilot industrial works will produce, it is proposed to sell 2,000 at one-time prices--at first only in Kuybyshev Oblast, and then throughout the country. The scientific and technical center will register the owners of the new models and will begin to maintain constant contact with them. We hope that they will also aid in some way the improvement of the innovations of the Volga Motor Vehicle Works. There are many talented inventors among motorists, their creative potential is enormous, but for the present it is being used poorly. But for the embodiment of even the most advanced idea it is also necessary to prepare production itself--and in the shortest time. If you delay a little, the idea will have already lost its freshness, while the motor vehicle will have lost its competitive ability. Having carefully studied the sales charts of motor vehicles of the Volga Motor Vehicle Works abroad, we became convinced that even a short delay with the production of a new model has a deplorable effect on the demand for it.

[Question] That is just the point. Suppose that the scientific and technical center will achieve the maximum acceleration in the development of new models of vehicles. But is the technical level of the Volga Motor Vehicle Works sufficient to keep up with you? For the preparation of the production of new vehicles is both the construction of shops and the development of new accessories, tools, machine tools....not only money, but also time are needed for such reorganization.

[Answer] The Volga Motor Vehicle Plant has no alternatives: it should assimilate a new base model once every 5 years, and preferably every 4 years. That is why such serious modernization of production is now under way at the motor vehicle works, and its main unit is the introduction of flexible machine and robotized systems. They will make it possible to put new models on the conveyor much more rapidly than before. Several such systems have already been tested on a "0-8" model: the robotized welding line of the "8" is

incomparable to the line which not that long ago welded the VAZ-2105. During the current five-year plan the Volga Motor Vehicle Works will very nearly double the volume of its own machine tool building, and this is a decisive factor of the campaign for the rapid updating of base models.

[Question] Will the pilot industrial production of the scientific and technical center probably be furnished first of all with the most advanced equipment?

[Answer] It will be much simpler precisely with it. Complex and expensive automatic lines are not needed for the production of 3,000 vehicles. For this it is sufficient to have only quickly readjustable NC machine tools and general-purpose equipment, on which during the day it would be possible to change over from one model to another. No, our main expenditures--both intellectual and monetary--will be not here, not in the pilot production of vehicles, but in the creation of a modern design and research base, the maternity home of the new motor vehicle.

[Question] What will the total amounts of work in case of the establishment of the scientific and technical center tentatively be?

[Answer] It will be necessary to build tens of thousands of square meters of production area for the scientific and technical center. During the current five-year plan approximately three-fourths of the assets should be assimilated, while the scientific and technical center should be completely built by the end of 1992. It is natural that the center will not be capable of developing new vehicles and ones of the highest level, as was contemplated, if the enterprises of other ministries, which supply the automotive industry workers with metal, tires, plastics, industrial rubber items, and other materials and items, do not support it. All these components of the motor vehicle should be namely of that quality which the developers of the new model will assign to them. There can be no compromises here, otherwise they will immediately reduce any fine idea to naught. Only together, only jointly will we be able to accomplish the unusually tempting, but also unusually difficult task which the party has set for us.

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PATENTS AND INVENTIONS

HEAT METERS SAVE ENERGY

Moscow PRAVDA in Russian 11 Aug 86 p 7

[Article under the rubric "Inventions": "An Instrument Which 'Makes Life Difficult'"]

[Text] The Tallinn Plant of Measuring Instruments jointly with the Belorussian Affiliate of the Institute of Power Engineering imeni Krzhizhanoviskiy developed on the basis of an invention of Honored Inventor of the Estonian SSR M. Gammerman and his colleagues the first meter in our country, which is capable not only of registering the consumption of heat, but also of regulating its delivery strictly in accordance with existing norms.

The instrument includes, in addition to the immediate gauges of the temperature at the input and output, of course, also a computer device, which is able to put out the results on a recorder or display and, moreover, to deal efficiently with the mechanisms which regulate the release of hot water or steam.

The invention was registered in 1976. A decade, during which, of course, much water, which used for heating a large amount of fuel, passed through pipes, has passed. Fuel which must be saved. But in the time that has passed a large number of "strict meters" have been installed at only a few heat and electric power plants, mainly in Moscow. Are they perhaps of little good? No, the need for automatic monitors and regulators is large. Uncontrolled deliveries of heat for some people create at times an unbearable high temperature, for others--the excessive consumption of fuel. So why is there such a cool attitude toward the innovation?

The point is that, however strange, the consumer pays for the excessive consumption: they register only the "outgoing" heat. It is unknown how much of it "arrives" and how much was lost on the way. But now imagine that a meter has been installed in the access. Now it will show the "short weight," the payment for heating will accordingly be reduced, which will find reflection in the indicators of the work of power engineers.... If they feed heat according to the norm, but the residents are freezing, let them patch the cracks in the windows and not forget to winterize the doors.

Meters will not allow the workers of heat and electric power plants to consume excessive heat and will force them to manage the system properly.

At one of the Olympic facilities by means of heat flow meters it was possible to reduce the consumption of energy to one-fifth, by 80,000 rubles. A single instrument yields a saving of 1,500 rubles a year, while the total impact takes the form of a 15-percent fuel saving. So that it makes sense to speed up the mass production of these instruments.

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SOVIET-CSSR COOPERATION IN INSTRUMENT MAKING

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 30 Aug 86 p 1

[Interview with I. Goloto, deputy chief of the Foreign Relations Administration of the USSR Ministry of Instrument Making, Automation Equipment, and Control Systems, by Ye. Chernova: "With What Did They Return From the Trip?"; date, place, and occasion not given; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] A delegation of specialists of the USSR Ministry of Instrument Making, Automation Equipment, and Control Systems has just returned from Czechoslovakia. We asked I. Goloto, deputy chief of the Foreign Relations Administration of the ministry and a participant in the talks, to tell about the results of the trip.

[Answer] We left for the CSSR with a clear task: to find new advanced forms of scientific and technical cooperation. They seemed to us to be a joint scientific research and experimental design collective, as well as a joint enterprise.

The attention of the delegation was focused on two questions. The first concerns microelectronics. Here is where there is freedom for cooperation. Both the USSR and Czechoslovakia have made definite gains in the development of hybrid integrated circuits, but, by dealing with them separately, we are lengthening the time of development of prototypes, and due to the small sizes of the series they are expensive, while at times become entirely unprofitable. It is another thing to organize interstate cooperation, when reciprocal deliveries would pay for the commercial production of the most diverse circuits.

The other group of questions pertains to medical instruments, particularly the production of disposable medical needles. Their use would eliminate infection with jaundice and other dangerous diseases, therefore, physicians are raising very urgently the question of them before the Ministry of Instrument Making, Automation Equipment, and Control Systems.

The development of automation equipment for the large-series production of disposable needles is already being completed in Czechoslovakia. The Ministry of Instrument Making, Automation Equipment, and Control Systems is working on

similar tasks, and the uniting of the scientific, technical, and production potential of our sectors would enable us to speed up the solution of the problem by twofold. In turn, our assistance is also profitable to Czechoslovakia.

The development of control and measuring technological equipment and special materials is also a field for cooperation with the CSSR. Therefore, joint scientific research and experimental design collectives are necessary and timely. The candidates have already been determined: on the Czech part they are the VUMA and TESLA plants, on our part they are the Yaroslavl Elektronpribor Scientific Production Association and several other institutes.

For the present they have made arrangements as follows: the Ministry of Instrument Making, Automation Equipment, and Control Systems in the immediate future is inviting to the USSR Czech specialists and after the exchange of mutual information is drafting a contract on long-term cooperation.

Such are the results of just one trip.

[Question] How do you evaluate the use of the possibilities of economic cooperation in your sector?

[Answer] Stable relations with all the socialist and many capitalist countries have been established within the Ministry of Instrument Making, Automation Equipment, and Control Systems.

Definite results also exist. For example, in a short time the Smolensk Tekhnopribor Scientific Production Association and the Finnish firm of NOKIA in accordance with a joint program developed a robotized assembly center, which in the fall will be displayed at the Elektronmash-86 Exhibition.

But in the contacts even with CEMA countries we have so far used far from all the opportunities. In recent times the sector has been making vigorous efforts, eliminating the shortcomings in this direction, and, I hope, the scientific and technical cooperation of the USSR with many countries will receive new strong momentum.

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BULGARIAN SYSTEM FOR REGISTRATION OF FOREIGN BUSINESS TRIPS

Moscow IZVESTIYA in Russian 7 Aug 86 p 5

[Article by IZVESTIYA correspondent V. Zakharko under the rubric "From the Bulgarian Notebook" (Sofia): "The Business Trip Abroad. Is It Always Expedient? If 'Yes,' How Effective Is It?"

[Text] Not in this building on Naser Street in Sofia do they decide whether one business trip or another from Bulgaria abroad will take place. But from here they can influence such a decision.

One of the departments of the Central Institute of Scientific and Technical Information is also called that: the Department of Foreign Business Trips. Lidiya Karamiteva, its expert, and I sit together at a personal computer.

"Recently," she relates, "the Executive Committee of the Sofia People's Council defined more accurately for itself, to what countries its specialists will go to familiarize themselves with the experience in various sectors of the national economy--it was a question of housing construction, transportation, municipal and personal services, and the provision of amenities. The themes on important problems for Sofia were specified. But when they asked us to take part in this matter, it turned out that almost a third of the planned business trips will duplicate trips previously made abroad."

Karamiteva began to tap the keys with her fingers. The line: "landscaping of cities," lit up at the top of the screen.

"Let us take, for example, this theme. Of course, Sofia itself has something here to show, but it is also useful to know what they know how to do in other countries. The executive committee had planned to send a specialist abroad. But here is what developed...."

Again the fingers of my companion touched a key, and then the entire screen was already filled with a text. A minute latter we obtained in on paper from the printer which is near by.

Thus, the computer reports that in the past 4 years alone there were eight business trips from Bulgaria of individual specialists and groups for the

purpose of studying the experience in the area of landscaping--to Hungary, the GDR, Czechoslovakia, the Soviet Union, England, and the FRG. Detailed reports on each of the trips are in the library of the Central Institute of Scientific and Technical Information. But in the executive committee of the city council they did not know this--it was not it that sent people abroad, but other organizations. In particular, the National Agroindustrial Union, the Ministry of National Education, and even the Neftekhim Combine in Burgas, which sent two engineers to Hungary, where they familiarized themselves with the practice of landscaping industrial enterprises, and their report on six typed pages is also at the Central Institute of Scientific and Technical Information.

The institute coordinates and monitors the gathering, processing, and dissemination of scientific and technical information in the country at all levels: the national, sectorial, subsectorial, and local levels. More than 20 million documents are stored here, and the amount of information arriving here is constantly increasing. The Central Institute of Scientific and Technical Information is closely linked with analogous centers in the Soviet Union, other CEMA countries, and 20 other states, which is affording Bulgaria extensive access to the latest achievements in many spheres of knowledge and production. A powerful computer base has been established at the institute. In all 14 automated systems, including the YeSKOM--the Unified System of the Registration of Foreign Business Trips and Reports on Them--are in operation.

Next to the wide main entrance of the Central Institute of Scientific and Technical Information the small door with the plate: "Reception Room of the Department of Foreign Business Trips," is not immediately conspicuous. But many people are familiar with the route here.

In my presence a young man came in, he was a staff member of a geology institute:

"I am thinking of going to a geology congress in France. Here is a draft of the order on my business trip."

"Leave it with us. In a few days your institute will receive the necessary information," expert M. Georgiyeva replied.

A messenger brought a package from the Energetika Economic Association. In it there is also a draft of an order--on the sending to Moscow of an engineer for the purpose of studying new technical solutions which are connected with the saving of electric power.

I go through a folder with a large number of similar documents. A letter on a form of Sofia University reports that a 2-month trip to the United States of a docent for joint research with American scientists lies ahead. The Tsvetna metallurgiya Corporation is sending a laboratory chief and a shop chief to Czechoslovakia to master the know-how of processing aluminum slags. A shoe factory is sending four of its specialists to the FRG, where they should familiarize themselves with the production of new models of sports shoes. A candidate of biological sciences is going to Italy to an international seminar on genetic engineering and biotechnology.... Many letters arrived from other cities.

"The YeSKOM system conducts registration on the scale of the country," Angelina Abramovich, chief of the department, explains. "But only of the business trips, the goal of which is the study of foreign know-how, scientific or engineering specialization, participation in international congresses and symposiums and in joint development, and vocational and technical training."

In accordance with a decree of the government, the sending organs send here drafts of the orders for each of such trips with an indication of their theme. As Penyu Kiratsov, general director of the institute, explained, this is done first of all in order to help organizations in obtaining the necessary information on the questions which interest them: who is working in what country and on what, what of the foreign know-how with respect to this theme is already known in Bulgaria.

In sending the draft of the order back, the institute indicates what specific information is available in its abundant collections. It is possible owing to it to avoid repetitions of what has been covered, to prepare the specialist better for the trip, and to extend the theme. Or--as was the case after the inquiry of the Sofia Executive Committee--to reject several themes, to replace them with new ones, and to choose new addresses for familiarization with the know-how of others.

In the same governmental document it was stated that after each business trip a brief, but detailed professional report on what was seen and done, which might also become useful for other organizations, should be drawn up and turned over to the Central Institute of Scientific and Technical Information. The YeSKOM exactly monitors the receipt of reports and feeds their content into the memory of the computer.

"Let it not seem to you," Kiratsov says, "that troublesome correspondence is required for our system and it complicates the procedure of registering foreign business trips. This, after all, is easy--to make and send a copy of the draft of the order on the trip. A reply arrives in a few days. Urgent business trips, when it was determined today that a person must fly somewhere tomorrow, are not liable to registration."

The YeSKOM has been operating for 8 years, and it justifies its purpose, the general director believes. Much valuable information has been accumulated through the reports on trips. Put together in one place, it is being used throughout the country in various fields of knowledge and the national economy. Last year alone the use of foreign know-how, which is connected with technical and technological innovations, yielded an impact of more than 12 million levs.

"By its existence this system," P. Kiratsov concludes, "opposes official trips being used as tourist outings at the expense of the state. It identifies cases--there are still many of them--of the senselessness of some business trips or others, and we do not make a secret of this to state and party organs. The goal, as you see, is not the decrease of the number of trips, but the establishment of the maximum order here."
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LATVIAN SCIENTISTS ON SCIENCE-PRODUCTION COOPERATION

Riga NAUKA I TEKHNIKA in Russian No 7, Jul 86 pp 6-10

[Article: "Scientific and Production: The Policy of Cooperation"; first two paragraphs are NAUKA I TEKHNIKA introduction]

[Text] To promote the achievements of science and technology of Soviet Latvia and to make them accessible to the readers--our journal was established a quarter century ago for this purpose. However, today simple popularization of knowledge is already insufficient: after the 27th party congress, at the new, critical stage of the socioeconomic development of the country, the cardinal acceleration of scientific and technical progress is required. The press should also make its contribution to the accomplishment of this task. And first of all by the formation of public opinion and a disposition for the surmounting of the barriers and inertia of thinking, which are still hindering the quickest introduction of innovations.

How do leading scientists of our republic see the means of scientific and technical progress? The editorial board invited several of them to a round table. President of the Latvian SSR Academy of Sciences Academician Bruno Andreyevich Purin; Academician Eduard Aleksandrovich Yakubaytis, vice president of the academy and director of the Institute of Electronics and Computer Technology of the Latvian SSR Academy of Sciences; Academician Secretary of the Chemical and Biological Sciences Department Rita Aleksandrovna Kukayn, director of the Institute of Microbiology imeni A. Kirkhenshteyn; Talis Niklasovich Miller, director of the Institute of Inorganic Chemistry; Corresponding Member of the Latvian SSR Academy of Sciences Yan Yanovich Liyelpeter, deputy director for scientific work of the Institute of Physics of the Latvian SSR Academy of Sciences; and Zigfrid Karlovich Aumeyster, chief of the Science and Technology Department of the State Planning Committee attached to the Latvian SSR Council of Ministers, participated in the discussion.

B.A. Purin: I will begin, perhaps, with the most important event in the life of the country. You know that I was fortunate enough to be at the congress, and before this at the June conference, which was devoted just to the problems of scientific and technical progress. There are, of course, many impressions, and the most gratifying ones, all of us have a fighting spirit for the party is attaching decisive importance precisely to science under the present

conditions. The thesis: the front line of the campaign for technical progress passes through science, underscores its special role. Much has to be revised, in all spheres of activity without exception. Without this the acceleration of the socioeconomic development of the country is simply impossible. And we need to reform in the shortest time: by ensuring the leading development of fundamental, basic research, to accomplish jointly the main task--to bring science as close as possible to production. The basic form of the realization of this process is the establishment of interbranch scientific technical complexes in the leading directions of scientific and technical progress. All-union complexes exist, there are 17 of them, and the scientific forces of the republic are participating in 2 of them--the Biogen and Anticorrosion complexes.

We all understand that it is necessary to work in a new way. But how? The task of the people working in science is to develop science itself, to pass as quickly as possible through all the units: from the laboratory to production. It is important that production workers would also clearly realize this. If it can be expressed this way, it is necessary to approach "the point of juncture" from two directions. I will cite an example of a different attitude toward this problem. Recently I had a conversation with Comrade Lenev, director of the VEF Association. I should state frankly that many production workers as before are of an unequivocal disposition: the initiative is up to scientists. But several scientists are saying in turn: no, it is you, dear comrades, take an interest in science, seek and introduce innovations at your place. Still it seems that the correct means is the mutual means.

Although your journal is also doing quite a lot for the popularization of science, I would like the press to inform the public more extensively and more about what the Latvian Academy of Sciences is giving the republic and the country. I am convinced and know from experience: not that much is known about what kind of research and how much is being successfully conducted at academic institutes.

Let us recall that the Academy of Sciences is called upon to implement the scientific and technical policy in the republic. And, indeed, this is its largest scientific research organization, which unites 15 institutes, 6 special design and technological bureaus, 3 pilot plants, and an engineering and technical center. About 120 doctors of sciences and thousands of candidates work here. Higher educational institutions and sectorial institutes account for 44 percent of the scientists. It is also a large potential, but what is the return? We checked a number of sectorial scientific research and design and technological organizations and gave them the corresponding recommendations. We hope that they will work more efficiently.

There are many unsolved organizational problems. Let us take our pilot works. Unfortunately, so far they compare in the basic indicators with industrial enterprises, and this, of course, hinders the process of introducing new equipment and advanced technologies.

It seems expedient also to change the very system of the overall planning of the staff and financial structure of the academy. Such a thing as a limit on

different items of expenditure--"Science," "Scientific Service," and "Miscellaneous"--exists. Imagine that we do not have the right to break the limits down by these items and thereby are deprived of the opportunity to display initiative and to maneuver. Assume that the scientific and production potential enables us to complete a number of above-plan developments on introduction, but the limit says--no, you must not. Here it turns out that this very limit limits the acceleration of scientific and technical progress. The mechanism of all kinds of consultations is rather troublesome, and it is getting untwisted not at all at the pace which the times are setting for us.

Question: All these are problems mainly of an economic nature. Does this mean that purely scientific problems do not exist in academic science?

B.A. Purin: Of course, such problems do exist, and they are very important for the fate of science as a whole. The point is that we need to approach especially carefully, I would say even sensitively, the evaluation of the basic research which is being conducted at our institutes. To sense, for example, where there is not quite enough of this very fundamentality and what directions today are not very urgent. Time itself dictates: you will not solve the main problems, if you do not concentrate the basic forces on them. A portion of the work, therefore, should be slowed down, stopped, perhaps. This matter is very tricky and difficult--it is easy to make a mistake, but a mistake of this sort can be too expensive. We know many examples of that, let us recall if only the fate of cybernetics and the same genetics. But when planning scientific research it is necessary all the same to concentrate scientific efforts on some main directions, since at the present stage the development of the economy of our country is of an intensive, and not an extensive, nature. Not to allow mistakes in this case is a very serious problem for scientists.

There is a second problem which follows from the first. Perhaps, this sounds somewhat bureaucratic, but we have to make an inventory of applied scientific developments, to dwell on the most important ones, and to ensure their most rapid large-scale introduction. But a living person is behind every reduction, behind every theme that has been deemed not urgent, and it seems to him that he is doing a necessary job.... Here he is, the human factor in science....

Question: Is research, which promises genuine changes in the direction of the quickest intensification of science and production, now being conducted at academic institutes?

B.A. Purin: Of course, it is. Let us take the research on magnetohydrodynamics. This direction, which is being developed at the Institute of Physics, already has quite a large number of outlets into practice, but there will be even more. The point is that there are production processes, which it is simply impossible to improve by other means. This is also appearance in nonferrous metallurgy for the obtaining of better quality metals and alloys, this is magnetic fluids, which are affording completely new possibilities in technology and medicine, this is new methods of developing materials, especially semiconductor materials. The work on fiber optics is extremely promising--it is being conducted at the Institute of Physics and the

Institute of Physics and Power Engineering. There is a reserve of interesting work on molecular electronics: the end results for the present can only be divined, but in the future promise much. Or let us take the plasma chemistry of inorganic compounds--it is being developed more and more extensively. While the questions of genetics and biology are today in general problem number one with an outlet to the year 2000 and beyond, entirely new approaches and solutions can also be felt here. Perhaps, we should give the floor to Rita Aleksandrovna?

R.A. Kukayn: I should immediately stimulate: the very word "introduction" reflects well the painful essence of this process, especially if it is a question of the introduction of scientific results in the practice of agriculture and biological practice. In medicine there is a different situation--medical personnel very willingly meet all kinds of innovations half way. In agriculture the process, which has its origin in basic research to the introduction of the end results at a separate, entirely specific farm, is actually reflected completely in the essence of the word "introduction," because it occurs, as a rule, let us state frankly, by coercion. Let us take our Institute of Microbiology. One of the directions, on which it has been working since 1965, is leukosis of large-horned cattle. I believe that there is no need to demonstrate how vitally important this research is for agriculture of the republic. We have developed a method of the early diagnosis of leukosis: when an animal is still healthy in practice, by means of our very simple method it is possible say that it is already infected with the virus and is a source of its spread.

But here is what is happening--for long years no one wanted to introduce this method! It is disadvantageous, it turns out, for veterinarians to make public how many animals are infected with the virus. Here they detect the disease by another method--the hematological method, since it is not as sensitive and reveals a negligible number of sick cows. And, after all, it is typical: precisely the leading farms, and first of all in Estonia, have been using our method for about 5-6 years now. True, significant reorganization has now also occurred here, because 2 years ago the former Ministry of Agriculture obliged veterinarians and veterinary stations to use this method for the diagnosis of leukosis.

We attempted to find an answer to the question of why it is disadvantageous for our farms to introduce scientific developments which make it possible to intensify dairy animal husbandry. Economists suggested an answer: if farms were a little more independent, if they displayed genuine interest in their job, they would seek themselves means of intensification. But for this it is necessary that the decision of the congress on increasing the responsibility of each worker and each manager for his own job would be implemented.

But let us return to the problems of introduction. For academic institutes integration with sectorial institutes and, in our case, with agricultural institutes is very important. A vivid example of this is the Institute of Wood Chemistry, at which a new technology of obtaining peat molasses with a large number of technical innovations was developed--how to process high-moor peat and after fermentation to convert it into protein, of which, as before, we do not have enough. But the staff members of the institute are only

chemical process engineers who developed an original production process for the obtaining of a new fodder product. Only specialists in animal husbandry can check its biological value and give recommendations on use. But they are at the Institute of Animal Husbandry and Veterinary Science.

It is very important that precisely this institute finally took an interest in our developments. This is a change, and a very significant one. It would hardly be proper, for example, that we virologists introduced ourselves our own developments at farms and tested them ourselves. For this would be not very skilled work. We have now established good contact with specialists of this institute in the problems of leukosis--its diagnosis and prevention. It has been decided to conduct an experiment--to make the herd of several farms healthier. And then everyone, finally, will be convinced that it is possible in general to put an end to leukosis. I will add that in Estonia at a large number of farms they have already achieved this by using our method. But agriculture of this northern neighbor of ours is also leading the way with respect to the other indicators, we are merely following it....

I hope that now this turn toward what is new is still being made. I can bring myself to speak this way because a few days ago the chief specialists of one farm, at which a plan of the intensification of production is being drawn up, came to us. They turned themselves to us for assistance--and this is the first time in the 40-year existence of the institute!

Question: Rita Aleksandrovna, but how do you explain this activity in the relations with science?

R.A. Kukayn: I believe that the reason lies in the general mood today. I also believe that the needs of agricultural production have become closer to our academic institute. I will cite an example--virologists of the institute are familiar with the methods of culturing the animal cell and can manipulate it. Here the idea occurred to use this experience of ours in order to accumulate a bank of embryonic cells of elite cows for subsequent embryo transplantation. You transplant such an ovicell to an ordinary brown-eared cow, which lives longer and is not so finical, and you get from it elite progeny. In a number of countries this entire matter has already been organized on a commercial basis. We see the next stage of the work in the development of a bank of ovicells of cows which are resistant to leukosis, in order to breed a line of the Latvian brown cow, which in addition to its good qualities will be even more resistant to the virus. And note--with the aid of animal husbandry specialists and, hence, sectorial science.

Question: How much of everything has already been written about EMAGO! How much has been said about what a remarkable technology this is. Why is this method being introduced so little in the republic?

E.A. Yakubaytis: This concerns not only EMAGO, it is possible to name a large number of examples.

Ya.Ya. Liyelpeter: The question with EMAGO, it seems to me, is quite simple. This device is a separate component of some automated system. And it does not solve anything, if we do not have such a system. And this is not the

specialization of the Institute of Physics--to design automated lines. It is probably as follows: if the sectorial institutes, which deal with the automation of production processes, were to use this idea and to incorporate it in production, things would get moving. In recent years EMAGO has found partial solution in robotics. But this does not settle the entire problem. Apparently, the main reason still lies in the fact that these devices are being used not in combination. And another thing is that for the present these devices are not being series produced, there are even no technical specifications for them. However strange this sounds, we do not have enough designers. The Special Design Bureau of Magnetohydrodynamics has only 20 specialists of this type. Not to mention the workers who would make these devices. But meanwhile external circumstances dictate: make a new machine or unit at the level of an invention and turn them over to production.

The following question is also arising: By what means does the enterprise obtain information on one development or another? The basic source is probably popular literature and the mass media--the press, radio, and television. Just yesterday we received a booklet from the State Planning Committee on the latest developments with the question: What would you like to introduce at your place? In my opinion, such a booklet should be sent to plants and also be addressed to them....

This level of information, it seems to me, influences in a most substantial way what is introduced and what is not. It would be good if your journal would analyze in what ways information comes to the works.

I want to add to what has been said about magnetohydrodynamic methods. They have yielded much that is new and promising, but we believe that it is possible to expect even more in the future. It is a question of developing new promising materials and semiconductor crystals and of obtaining ultrapure metals and special alloys, which it is impossible to produce by conventional methods and technologies. We are confident that magnetohydrodynamic methods will make it possible to obtain a number of completely unique materials. Unfortunately, they will be used little in the republic, but such a note of regret--it is justified only from the standpoint of our local interests.

B.A. Purin: The question of information and the degree of being informed is extremely important. Recently the question of new products of the VEF Production Association and the RAF Plant was examined in the Council for the Promotion of Scientific and Technical Progress of the Latvian CP Central Committee. The new republic Quality-90 Program was discussed at that time, specific parameters with consideration for the future have been incorporated in it. But meanwhile, whether these parameters correspond to our potentials from the standpoint of materials and technologies--we do not have such data. But how, I beg your pardon, is it possible to forecast in earnest the output of products at a world class level, and also with an outlook for tomorrow, without the supply of materials and technologies? Is it perhaps the very moment to give a precise assignment to some scientific research institute or other to do some work in some specific fields? No, it is extremely important that in all the major directions of scientific research and technological work in the republic there would be their own data banks.

The Institute of Electronics and Computer Technology is doing much work in this area. Its specialists have proposed a fundamentally new solution--via local area networks. Now they are being introduced at the Academy of Sciences. In the future they should also encompass industry. Networks will exist. But data banks in the basic directions of scientific and technical progress are also needed.

T.N. Miller: Today we are frequently uttering here--fundamentally new. I also cannot do without this, because the Institute of Inorganic Chemistry is also engaged mainly in the research which is connected, as a rule, with the development of fundamentally new technologies. Thus, we have obtained quite a large number of new compounds, they are beginning to use them in the production of new materials. The second direction is the protection of metals against corrosion, which is turning into a large saving of material resources. Our developments are connected precisely with the scientific directions which were discussed at the 27th CPSU Congress. I have in mind membrane and plasma technologies. These are extremely promising technologies. However, the introduction of precisely these latest technological solutions is encountering enormous, at any rate, difficulties. Very much work is being done on plasma technologies. Both in our country and throughout the world they are for the present going through the stage of formation. And, as it turns out, not one of the state plans yet envisages such production and its supply with equipment and materials.

We introduce our own technologies initially at our special design and technological bureau. Then we turn the equipment and technology over to interested organizations and under designer's supervision introduce them in production sections and plant shops.

As to membrane technology, here its own difficulties exist. The point is that for the present the production of a wide assortment of membranes has not been set up in our country. But all the same we cannot do without such technologies. For it is a question here no longer of individual percentages of the increase of productivity, but of a pronounced leap forward.

And here is what I also want to say. It is possible to characterize quite succinctly the situation that has formed at works--they have "specialized" excessively and have confined themselves to the production of some specific product. Here, for example, an entire group of converters of rust--Buvanol and a number of others--has been developed at our institute. But just try to introduce them in production, if they are not included in the products list of the given chemical enterprise! True, with the assistance of the State Planning Committee and other organizations the problem still has as if been solved in part in the republic and beyond it, but this matter, as before, is not among the easy ones.

There is another typical example. The protection of metals against the effect of various corrosive media is a multidimensional problem. Here we have the most comprehensive ideas. During the past five-year plan the republic Anticorrosion Scientific and Technical Program already existed. Now we are planning to establish a truly powerful experimental design bureau with a pilot works of the appropriate capacity: we will have to, apparently, produce

ourselves the first batches of the new protective agents. We also intend to plan the construction of a corrosion test station--such a station does not yet exist on the shores of the Baltic.

Question: What all the same is the situation with corrosion-resisting coatings, about which much has also been written? What are the tasks of the Anticorrosion Program?

T.N. Miller: Our institute belongs to an interbranch scientific technical complex which is also called that--the Anticorrosion Complex. There is also an experimental design and technological bureau. But for the present it is difficult to say with what fraction of success this program will be implemented. We will, of course, work to full effect.

There is also the following "dark" side of this question--the protection of metals and components does not worry the users too much. For how does the situation stand? In any sector of production it is much easier to elicit physical assets for new metal than to protect old components against rust and corrosion. It is even easier to get a new component! And this is on the scale of the entire country. We are not very assiduous managers. Hence, it is necessary to increase in some manner the responsibility of managers for the saving of material resources.

Question: The fact that the potential of VUZ and sectorial science is quite large has already been spoken about here. But are they not, as before, keeping aloof of the main jobs?

B.A. Purin: No doubt, higher educational institutions have a large scientific potential, they have strong scientific personnel. But they have, unfortunately, a weak production base. And there are a large number of small sectorial scientific research organizations and design bureaus, which in fact are not engaged in research work. Moreover, they have simply been divorced from their sectors. But this is also still not everything. Here we are now attempting to help the enterprises of Moskovskiy Rayon, since we are on its territory. They have enough problems, even though they are not vital, it is necessary to solve them in some way. We say: we have sectorial institutes and organizations, which are called upon to ensure the settlement of technical questions. And we learn that several enterprises do not even have an idea of what kind of sectorial institutes these are. Here is what kind of gap exists in practice between sectorial science and production.

It seems that it is simply necessary to include a portion of the sectorial scientific research institutes within scientific production associations, then they have nowhere to go--they will have to work directly for industry. The second solution is scientific technical complexes. For the following idea is also incorporated in them: to "mate" academic, VUZ, and sectorial science with a pilot base and a plant. For the present many sectorial institutes are simply performing certain management functions under the corresponding ministry or department: with the reduction of the administrative staff a portion of its functions is simply shifted onto the institutes. There are, true, also gratifying examples--these are the sectorial institutes of the

Agroindustrial Committee, we are, as you have already heard today, successfully establishing contact and cooperating with them.

But what is the task? Specific sectors of the national economy of the republic should support the scientific and technical developments which are being devised at sectorial institutes.

R.A. Kukayn: And to construct a bridge from academic science to sectorial science.

B.A. Purin: The scientific technical complexes are also being established precisely for this reason, while at academic institutes, which previously, as a rule, did not have their own pilot experimental base, design bureaus and pilot enterprises are being established. Previously we thought as follows: "academicians" generate ideas and turn them over to sectorial institutes, while the latter in turn bring scientific ideas up to production. But such a chain in many cases proved to be unsound. Therefore, the Academy of Sciences was forced to develop its own experiment base in order to have the opportunity to go directly to production and its needs.

Question: Tell me, please, about the interbranch scientific technical complexes. How many of them will there be in the republic?

B.A. Purin: As I have already stated, the Latvian SSR Academy of Sciences is participating in two all-union complexes--the Biogen and Anticorrosion complexes. Suggestions on the establishment of republic interbranch scientific technical complexes in biotechnology, the complete use of wood, machine building, corrosion protection, and household radio equipment have been formulated. The VEF Production Association is proposed to organize a complex in radio electronics for the solution of the problems of electronic switching equipment.

Question: And what will the complex in information science be?

E.A. Yakubaytis: Information science is now being called the catalyst of scientific and technical progress. However, this sector, which should deal with the problems of processing various types of information, is still only beginning to be established. A decision has now been made on the establishment of the Committee for Computer Technology and Information Science, but all this still lies ahead, moreover, the committee will not have its own plants which produce the necessary equipment. But what is one to do with the technical equipment of the sector? What will its production base be like? Our institute made an examination of the Radiotekhnika Production Association, during which it turned out: in order to change this enterprise over to the new level of work with the use of automatic equipment, 18 so-called local area networks--these are the computer networks of the radio shop, the plant management, the warehouse, and so on--will be needed.

What do we have today? Our republic, as they say, is advanced, but none of the enterprises (VEF, Radiotekhnika, Kommutator, and others) wants to produce information science equipment. We thought: Is it perhaps that no one needs this? And the Latvian SSR State Planning Committee sent the materials

procured by us with a description of the structure of the networks, the principles of their operation, and the basic equipment to various ministries and departments. As a result we received from the State Planning Committee a letter, in which it was stated that at the very first stage alone 666 networks will be needed in the republic. This means that enterprises and organizations are ready to buy even now such a number of networks. To tell the truth, we ourselves did not expect such an impact. But here is what is happening--everyone wants to have these networks, but no one intends to produce the necessary equipment. True, several enterprises, include VEF, appealed to us: help with the technical specifications, give your own developments, and we will make this equipment...for ourselves. That is how the situation with information science is today.

How does the scientific technical complex in information science with the as yet conditional name Information Network appear to us? It is proposed to unite in it science, instruction, technical development, and production, that is, the scientific forces of the Institute of Electronics and Computer Technology, the Scientific Research Institute of Planning of the State Planning Committee, the Latvian State University, and Riga Polytechnical Institute and the production potential of industrial enterprises. It is also advisable to establish in Riga an educational demonstration center in information science. Here it will be possible to become familiar with the latest achievements in the area of computer technology and information science and with new equipment, to hear lectures, and to participate in seminars. Specialists will have the opportunity to do some work under new technological conditions. For example, you come, sit down at a display screen, and begin to work with a data bank, which interests you and is located in Moscow, Paris, New York. We can do all this successfully already today.

Z.K. Aumeyster: Today two reproaches meant for the State Planning Committee have been heard quite justly here. Indeed, for the present the connection of science with production through design and technological organizations is simply not reflected in the plans which specify all the work for an annual and longer period. But who, if not they, are to perform the role of the clients of completed scientific research, which is necessary for the sector, and to develop the technologies and their technical equipment? Today design and technological bureaus are not always reliable in the professional respect, and besides the planned orientation of their daily work is very far from the actual needs of production. Perhaps, the Gauya Design and Technological Bureau of the Ministry of the Wood Processing Industry is coping better than others with its tasks, there are few, let us state frankly, other positive examples. Thus, the task of the State Planning Committee is seen in specifying jointly with scientific research centers of the academy, higher educational institutions, and the Ministry of Health in a resolute manner, and another opportunity is not foreseen in the next year or two, assignments for sectorial design bureaus on the development of the necessary technologies and individual items of hardware--equipment, instruments, devices, and so on. I cannot undertake today to assert how we will succeed in doing this, but we will do this.

I should say the following: the republic scientific and technical programs for the 12th Five-Year Plan are already a step forward. At any rate, in them

promising technologies are reflected and the performing organizations are named. Obviously, the management of the State Planning Committee agrees that for specific ministries and departments we will outline quite specific economic indicators in the area of scientific and technical progress, for example, the decrease of the production cost, the derivation of a profit, and the freeing of workers who are engaged in difficult and unproductive labor. And we will grant them freedom in the choice of means.

A second thing. Together with the Academy of Sciences we are formulating a program on the improvement of the scientific and technical information system in the republic. True, we believe that research institutes have abundant sources of information and, incidentally, are using them extensively. But here the production workers, as before, simply will not get accustomed to analyzing the really existing domestic and foreign information, even our largest associations and enterprises are suffering from this disease. In my opinion, precisely the lack of information is greatly hindering them from developing truly promising and competitive products.

Question: Is it possible to name a specific scientific development which promises a large national economic impact, but is not being introduced in production?

B.A. Purin: As many as you wish. Here our biologists made fertilizers with trace elements, which are very effective. For years we have been saying that this is a necessary, useful thing, but only test batches have been produced, the prospects of large-tonnage production are still very vague. Or advanced means of protecting metals against corrosion, which were spoken about here today. The same converters and inhibitors--the entire country needs them, but who is producing them? Or let us recall the front-by-front regulator which was developed at the Institute of Physics and Power Engineering. The entire union also needs them, but we are not capable of supplying the republic with them. The republic. Riga! Or the same information science equipment--local area networks.... Is this perhaps already enough?

The reasons? The force of inertia in the economic mechanism and in the thinking of individual managers of sectors and works is still strong. For what is happening? Enterprises are not displaying any interest in a new product. And what if it suddenly becomes less expensive than the one which has been produced up to now? As a rule, every director thinks: let someone else do it, and and I will look at what comes of this.

But we will look at the future with optimism. A significant potential of forces and knowledge has been accumulated, fundamentally new means of scientific and technical progress have been found. It only remains to work without sparing efforts and to display persistence and obstinacy in solving the truly vital problems.

From the editorial board: In the discussion, which touched upon the basic means of accelerating scientific and technical progress in the republic, it

was not possible to settle all the problems of the development of Latvian science and the strengthening of its contact with production. Our journal will return again and again to these themes.

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REPORT ON MEETING OF USSR ACADEMY OF SCIENCES

Moscow DOMESTIC SERVICE in Russian 1715 GMT 26 Oct 86

[Presented by scientific observer Andrey Zelentsov]

[Text] At the end of last week there took place in Moscow a general meeting of the USSR Academy of Sciences, which discussed how the decisions of the 27th CPSU Congress are being implemented. As we all know, the changeover of all social production to the path of intensification, which is going on in the country, depends to a large degree on the achievements of academic and sectorial research institutes, the task of whose research is to bring all the sectors of our economy up to the standard of today's requirements as soon as possible. What specifically has to be done to fulfill the task posed by the congress--that of intensifying the process of scientific research in every possible way and using the attained results in production? This was dealt with in the speeches by the scientists and also in the report on the work of all departments of the academy, which was delivered by Vladimir Aleksandrovich Kotelnikov, vice president of the academy. In particular, this is what he said:

[begin Kotelnikov recording] "In our academy a big shortcoming has been the fact that we have had a weak experimental production and instrument making base--in contrast, for example, to the Ukrainian Academy of Sciences--and this has undoubtedly reduced the practical fruitfulness of our research. I can announce that capital investment in the development of this base in the 12th Five-Year Plan is planned to increase by 150 percent over the 11th Five-Year Plan. The availability of good instruments is necessary for the development of science. Unfortunately, as we know, our instrument making industry cannot at present satisfy science. The importation of instruments, however, is hampered, first, by difficulties with currency and, second, by the fact that a number of the most up-to-date instruments in the capitalist countries are just not sold to us; there is a ban on them. The Academy of Sciences long ago raised the question of the need to expand the development and manufacture of instruments for scientific research in the country and also in the socialist countries. It is planned in the 12th Five-Year Plan to take a very big step forward in this area. Thus, at the USSR Academy of Sciences alone it is planned to create for this purpose a number of design bureaus and plants and bring the output of instruments up to 100 million rubles annually by 1990. We are charged with the task of developing and manufacturing custom-built

instruments which will be used chiefly for basic research and will be produced, at least initially, in small series. In order to concentrate efforts on a comprehensive solution of current problems in machine building, the new Problems of Machine Building, Mechanics, and Control Processes Department has been set up. A plan has been drawn up and approved for scientific research by the USSR Academy of Sciences on fundamental problems of machine building in the interests of the machine building ministries.

"Of very great importance for the development of science in socialist cooperation is the closely coordinated joint work with the socialist countries. CEMA has just made a decision to establish more active and concrete links between the countries and has selected the most pressing spheres for this. With the participation of the socialist countries, a program for these spheres has been drawn up, which in most cases has already been ratified, and a start has been made on signing contracts. It is planned to carry out this work not only under agreements, but also under contracts which will formulate the mutual obligations, including financial ones.

"Comrades, many of the Academy of Sciences' projects are being used successfully in the economy. The measures that are being taken here to stimulate scientific and technical progress, to set up interbranch scientific and technical complexes, and to create experimental pilot plants in the organizations of the Academy of Sciences will improve that process. Nonetheless, however, we must continue working to improve the way that the results of basic research are applied in the economy. There is the view that it would be useful if, whenever any research is completed, it is set forth in writing what should now be done with the results of that research. We have to start working in a new way, overcoming the rules and methods that have become ingrained and that are now outdated. None of this is simple. It is easy to say, but every time you get down to it, it turns out to be very difficult. But it has to be done. We all have to fight it jointly and put our lives and the development of science onto a new track." [end recording]

After the report by the vice president, the members of the academy began discussing it. And what was characteristic of this general meeting, in contrast to previous ones, was that all those who spoke focused their attention not on achievements, which are already well known enough, but on the shortcomings which are hindering productive work and hampering research in all fields of knowledge. All the speeches were accompanied by extremely specific proposals, not on the details of work done by one research institute or another, but on the principal aspects of scientific and technical policy. Here, for example, is an excerpt from the speech by Academician Kirill Yakovlevich Kondratyev.

[begin Kondratyev recording] "In the days when the Academy of Sciences and science in general were developing very fast, a lot of weak people got into science, while others fell into it simply by accident, and now we have no effective means of perfecting the ranks of scientific workers. I propose the following: first, to have a regular, annual reduction of staff in all institutes by 10 percent. [murmuring] That's right, I wanted to be more radical, but I decided to be modest and give the figure of 10 percent, but it is of course drawn out in time. Then, after analyzing the work of the

institute from the point of view of its urgency and effectiveness, and also the recruiting of young personnel, that number would be replaced or not replaced, depending on the specific circumstances. The second proposal: perhaps it is worthwhile for us to consider the system that they have, among other places, in the theater--staff on permanent and variable-length contracts. Why shouldn't we think about having two categories of staff in our academic institutes? Maybe this would also help speed up the dynamic pace of science." [end recording]

It is well known that for many years now there has been serious concern about the totally insufficient speed at which scientific developments are introduced into industry. This is due to a number of reasons, one of which is the shortcomings in the legal norms that are supposed to regulate the financial relationship between scientific organizations and industrial enterprises. The situation in this area was described to the audience by Academician Vladimir Maksimovich Tuchkevich.

[begin Tuchkevich recording] "The thing is that a certain number of years ago the Physical Technical Institute on its own initiative began looking for a solution to the problem of continuous monitoring of converter processes in ferrous and nonferrous metallurgy in order to improve the productive capacity of the processes, to sharply reduce the quantity of substandard output, and to produce steel of the requisite quality. The institute worked for several years along these lines and ultimately developed systems which were named FTIAN-3, which were to be introduced in the economy, at metallurgical plants, during this five-year plan, and which really do provide a great financial saving. Not only do they provide a financial saving, but they also in fact point to the need for a complete restructuring of the production of ferrous and nonferrous metals at our metallurgical plants. The Physical Technical Institute, with the help of our special design office and the laboratories at our institute, developed and manufactured 12 systems--not laboratory systems, but industrial ones--which were accepted by the appropriate interdepartmental commissions and which underwent state tests; and this, for an academic institute, is an extremely rare event. As a result of the state tests, our systems were awarded the Emblem of Quality and a recommendation that they be industrially manufactured. To date we have carried out more than 2,000 smelt operations at the Azovstal Combine, where these machines are installed, and also a large number of smelt operations at the Severonikel Combine, where copper and nickel are produced. The financial saving gained from using these systems is extremely great and runs into many millions of rubles. There is one figure that I must give that our work is involved with. As a result of the fact that the monitoring of these metallurgical processes is continuous, for example, the steel is smelted without turning down the converter. This saves time--approximately 6 minutes per smelt--in comparison with the old method of turning down the converter. And if you calculate what can be done in those 6 minutes, when you that that roughly 25-30 smelts are carried out per day, quite a lot of time is save and this means the combine can carry out more smelts without additional capital investment. Everything would seem to be fine. The Sumy works has been asked to manufacture about 100 of these systems. But we built 12 systems that are installed at the combines. We supplied them free of charge. To manufacture them, we were given 1.5 million rubles by the state. It would have seemed that we could return to the state

the 1.5 million rubles spent on developing and manufacturing them and also gain some extra money which could be used for development work at the Physical Technical Institute. But for this we would have to sell the systems, and it turns out--which was a big surprise to me--that an academic institute does not have the right to sell. If it does sell, then it can only be at less than the cost price. In other words, we cannot make any profit out of it. Naturally, this state of affairs puts us in a quandry. We started the work on our own initiative, we did a very good job, and we provided a big savings for the state; but initiative is in practice being suppressed. It think that this situation must definitely be changed." [end recording]

The party and the government have recently been adopting major programs aimed at sharply intensifying scientific research. Examples are the Comprehensive Program of Scientific and Technical Progress for all the CEMA member countries, and the creation of interbranch scientific and technical complexes. It was the implementation of these programs that Academician Boris Yevgenyevich Paton devoted his speech to.

[begin Paton recording] "Esteemed comrades, the 27th party congress posed for Soviet science extremely complex and responsible tasks, namely to make breakthroughs in the leading directions of scientific and technical progress and to bring about a profound reconstruction of the whole of our economy. Of indubitably great importance in this respect is the implementation of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000. As we all know, we have to solve a task of exceptional complexity and achieve, in an extremely short time, a leading position in the world along five key, priority lines of scientific and technical progress. At the same time, the experience we have gained has shown the exceptional importance of a serious analysis of the scientific and technical level of the detailed program and a comparison of that analysis with the existing and forecast development of primarily the western countries. We simply have to know the scientific and technical level of the most developed capitalist countries. Frequently this becomes a very difficult task because, as you know, technology is the most holy of holies to which there is virtually no access. But without this scientific and technical analysis it is impossible to make well-founded decisions that will help us definitely attain leading world positions. It appears necessary, therefore, to set up special subsections in the head institutes which would engage in this analysis. I am convinced that we must use all the possible and, if you like, also the impossible means of solving this task. Furthermore, we have to develop new principles of organizing scientific activity, linking science with production, and perfecting the so-called economic mechanism. It is only on this condition that world leadership in all five priority directions of the program will be achieved, not only in scientific and technical developments--which may be important and interesting in themselves--but in the most important thing: production and the economy as a whole. Favorable opportunities, comrades, for implementing the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries are opened up by the recent resolution of the Central Committee and the government on improving the management of foreign economic relations and on cooperation with the socialist countries. It is important to make effective and full use of these opportunities. Unfortunately, the academy is taking only the first few and, I would say,

faltering steps in this direction. A big role in this matter should belong to the interbranch scientific and technical complexes. It is no accident that they are the head organizations for many of the problems covered by the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries. However, it cannot be said definitely today that they are working at full power or are making maximum application of the opportunities they have been endowed with. In practice the majority of them are so far quite uncoordinated and difficult-to-manage conglomerations of enterprises and scientific research organizations. There are also completely unjustifiable and, it may be said, artificial difficulties. If this situation continues, achieving, and particularly exceeding, the world standard in various directions of scientific and technical progress will in a number of cases be problematic and may remain just wishful thinking. The same thing may be said of the fate of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries. What is needed is resolute and high-quality progress, and I must say bluntly that here a lot depends on us ourselves.

"Now, comrades, the second matter that I would like to talk briefly about: Scientists, as we all well know, must work energetically and fruitfully on pressing and important problems such as the operational reliability and safety of major national economic systems such as nuclear power plants, chemical plants, hydroprojects, open cast mining of all sorts of deposits, and certain others. Any miscalculations here may have far-reaching and sometimes, as we know, tragic consequences. Academic institutes must engage actively in developing new approaches to the making of decisions on implementing national economic projects and must be guided not by the current interests of individual departments, but by the aims of preserving the environment for the generations to come and ensuring the rational use of nature. Take, for instance, comrades, the problems of the construction of that major water conservation system, the Danube-Dnieper Canal. According to preliminary calculations, it will cost our state more than 30 billion rubles. However, even now there arises in our view justified doubt as to its necessity. The building of the canal will create problems of desalination of drowned estuaries cut off from the sea with negative ecological consequences, the creation of expensive and sophisticated technology for purifying the waters of the Danube polluted by European affluents, the flooding of vast irrigated tracts and adjacent lands, the problem, finally, of making harmless 5 or 6 cubic kilometers of highly mineralized drainage run-off, and a whole number of other problems. The system project has not yet been ratified, and the feasibility study for it has been sent back by a commission of experts of the USSR State Planning Committee for modification. But the construction workers, most regrettably, as happens in our country, have already started the preliminary work.

"Recently, comrades, the Politburo of the CPSU Central Committee decided to halt all work on the project to divert part of the flow of the northern and Siberian rivers to southern regions. And among other things, this decision sets the target of cutting water consumption in the national economy by 15-20 percent during the current five-year plan. If this volume of water is saved also during the subsequent five-year plans, then for the Ukraine by the year 2000 this will be equal to the volume of water which it planned in the future to divert via that same Danube-Dnieper Canal. What is needed here are

scientifically sound, concrete recommendations by the Academy of Sciences. Already now we must be seriously thinking about substantiating the figures for the amount of water required in social production and to generate the national income, just as we already do for power and metal consumption." [end recording]

As you know, new economic management mechanisms are now being experimentally tried out in the national economy. The results of several such experiments in agriculture were described to the audience by Academician Aleksandr Aleksandrovich Nikonov, president of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin.

[begin Nikonov recording] "The decisions adopted by the party Central Committee and the Council of Ministers, based on scientific development work, about intensive technologies of grain production are well known. Here are the preliminary figures for 1986. An additional ton has been obtained per hectare of winter crops, and more than a half a metric ton per hectare of spring crops. For each additional ruble spent on intensive technologies we have obtained an extra 1.80 rubles of top-quality produce. These technologies have been applied--true, with varying degrees of quality--on an area of 30 million hectares, which is just one-seventh of our country's arable area. A very great deal of work has yet to be done, therefore, in consistently applying these technologies. But the bottlenecks have been shown up: people's qualifications--although a lot has been done in the area of training and retraining; poor plant protection--because of the absence of home-produce pesticides; and poor-quality equipment. But technology is just one block, on fragment of the agricultural system as a whole, and it must be both developed and brought into each of the 49,500 kolkhozes and sovkhozes--and we realize this. But here certain solutions are already taking shape, in particular with regard to raising labor productivity. The picture we have now is a paradoxical one. The farms are laden with a mass of different types of machinery which is not always of good quality. Their value accumulates, but labor productivity nonetheless grows only slowly. Up to 70 percent of the people are still engaged in manual labor. But 2 years ago, within the framework of the decision on collective contracting that was approved by the party Central Committee a model for an intensive-labor collective was drawn up, the collective consisting of three to five people who were assigned 1,500 to 2,000 hectares of land. With the support of party organs, this system was applied in Novosibirsk and Kurgan Oblasts, and what were the results of the first 2 years? A doubling or trebling of labor productivity, increased pay, and reduced costs per unit of produce.

"What are the issues raised by these collectives? There are, in fact, three issues: first, there must be a smooth supply of equipment, seed of top-quality condition, fertilizers, pesticides, and fuel. Second, there must be scientific consultations. In these circumstances, people do not want simply to apply the fertilizers: they want to be aware of the conditions in every field and every strip of land. Last, they should not be commanded around. What does this mean? It means that there should be a change in the functions of the board of the kolkhoz or the management of the sovkhoz and a change in the structure and legal, social, and economic relationships. And it is here that there is a lot of joint work to do--for biologists, sociologists,

economists, mechanical engineers, and lawyers. But this is a problem that is worth working on jointly and which must be worked upon." [end recording]

During the 2 days of sessions, those taking part in the general meeting were unable to listen to speeches by everyone who wanted to speak. The new president of the USSR Academy of Sciences, Guriy Ivanovich Marchuk, therefore, proposed to all assembled that they put their suggestions in writing. The presidium will discuss absolutely all the suggestions, even if there are hundreds of them, he said, and at the next meeting it will report to the members of the academy about what has specifically been done to put them into practice. In his brief concluding speech, Guriy Ivanovich Marchuk said in particular as follows.

[begin Marchuk recording] "It is taking place slowly, but already something of a turning point is taking place, the one which the party and the 27th congress are calling on us to implement. At this general meeting, as I see it, we have in fact drawn out the major problems that we are living with, and which either are not being resolved for various reasons or have now to be resolved because new problems are arising. There has, therefore, been a lesser number of problems discussed to do with the profession, even though they may be pressing. I think that for these we need to meet more in the department, in the sections and in the Presidium, while questions of a general nature--the influence of the Academy of Sciences on the economy, on determining the paths of development of basic science and integrating it--these questions have already begun to be presented here with great concern and with great attention at our general meeting. So, comrades, I think that is a good beginning, and it indicates the maturity of our collective in understanding the major tasks that were set for us by the 27th party congress. And it is not by chance that we have talked a great deal at our general meeting about the problems which were revealed by the April Plenum and the 27th party congress, such as openness, democratism, and problems of improving the work efficiency of scientific staff at all levels. And this, I think, has been a considerable progress forward for us. The tasks which the party is setting for the USSR Academy of Sciences are considerable. They can be fulfilled only through the efforts of all scientists and the whole army of scientific staff, both in the Academy of Sciences and in the academies of the union republics." [end recording]

CSO: 1814/51-F

AWARDS AND PRIZES

AWARDING OF 1986 LENIN PRIZES IN SCIENCE, TECHNOLOGY

Moscow SOBRANIYE POSTANOVLENIY PRAVITELSTVA SOYUZA SOVETSKIKH SOTSIALISTICHESKIKH RESPUBLIK in Russian No 19, 1986 pp 319-320

[Decree No 463 of the CPSU Central Committee and the USSR Council of Ministers of 17 April 1986: "On the Awarding of the 1986 Lenin Prizes in Science and Technology"]

[Text] Decree of the CPSU Central Committee and the USSR Council of Ministers

On the Awarding of the 1986 Lenin Prizes in Science and Technology

Having considered the suggestion of the Committee for Lenin and USSR State Prizes in Science and Technology attached to the USSR Council of Ministers, the CPSU Central Committee and the USSR Council of Ministers resolve:

To award the 1986 Lenin Prizes in Science and Technology to:

1. Corresponding Member of the USSR Academy of Sciences Aleksandr Fedorovich Andreyev, deputy director of the Institute of Physics Problems imeni S.I. Vavilov of the USSR Academy of Sciences; Doctors of Physical Mathematical Sciences Konstantin Odisseyevich Keshishev and Aleksandr Yakovlevich Parshin, senior scientific associates of the same institute; Academician Yuriy Moiseyevich Kagan and Doctor of Physical Mathematical Sciences Leonid Aleksandrovich Maksimov, chiefs of laboratories of the Institute of Atomic Energy imeni I.V. Kurchatov; Candidate of Physical Mathematical Sciences Vladimir Andreyevich Mikheyev, head of a laboratory of the Physical Technical Institute of Low Temperatures of the Ukrainian SSR Academy of Sciences--for the series of works "The Tunnel Transport of Matter and Quantum Crystallization," which were published in 1972-1984.

2. Doctor of Physical Mathematical Sciences Sergey Petrovich Denisov and Corresponding Member of the USSR Academy of Sciences Yuriy Dmitriyevich Prokoshkin, chiefs of departments of the Institute of High Energy Physics; Doctor of Physical Mathematical Sciences Mirian Alekseyevich Mestvirishvili, chief of a laboratory of the same institute; Doctor of Physical Mathematical Sciences Nguyen Van Hieu, President of the National Center of Scientific Research attached to the Council of Ministers of the Socialist Republic of Vietnam--for the series of works "Inclusive Processes in Case of Strong

Interactions of Elementary Particles of High Energies and the Discovery of the Scale Invariance of These Processes."

3. Academician Viktor Pavlovich Maslov, head of a chair of the Moscow Institute of Electronic Machine Building--for the series of works "Global Asymptotic Methods of the Theory of Linear Equations With Partial Derivatives," which were published in 1961-1984.

4. Academician Vasiliy Vladimirovich Korshak, head of a chair of the Institute of Elementoorganic Compounds imeni A.N. Nesmeyanov of the USSR Academy of Sciences--for the series of works "The Processes of the Synthesis and the Properties of Polymers," which were published in 1969-1984.

5. Corresponding Member of the USSR Academy of Sciences Roman Beniaminovich Khesin-Lurye--for the series of works "The Molecular Principles of the Functioning of the Genome," which were published in 1960-1984.

6. Candidates of Technical Sciences Yuriy Nikolayevich Aleksandrov and Aleksey Ivanovich Sidorenko, senior scientific associates of the Institute of Radio Engineering and Electronics of the USSR Academy of Sciences; Candidate of Technical Sciences Viktor Aleksandrovich Grishmanovskiy, deputy chief designer of a scientific research institute; Candidate of Technical Sciences Nikolay Vasilyevich Zherikhin, deputy chief designer of the special design bureau of the Moscow Institute of Power Engineering; Candidate of Technical Sciences Gennadiy Alekseyevich Sokolov, chief of a laboratory of the same design bureau; Roald Savvovich Kremnev, director of the Scientific Testing Center imeni G.N. Babakin--for the radar surveying of the surface of the planet Venus from the Venera-15 and Venera-16 spacecraft.

7. Academician Grigoriy Grigoryevich Devyatykh, deputy director of the Institute of Chemistry of the USSR Academy of Sciences--for the series of works "The Development of Methods of Obtaining Highly Pure Volatile Substances," which were published in 1959-1984.

8. Academician Yuriy Nikolayevich Molin, director of the Institute of Chemical Kinetics and Combustion of the Siberian Department of the USSR Academy of Sciences; Doctor of Chemical Sciences Renad Zinnurovich Sagdeyev, deputy director, and Doctor of Physical Mathematical Sciences Kev Minullinovich Salikhov, senior scientific associate, workers of the same institute; Doctor of Chemical Sciences Anatoliy Leonidovich Buchachenko and Doctor of Physical Mathematical Sciences Yevgeniy Leonidovich Frankevich, heads of laboratories of the Institute of Chemical Physics of the USSR Academy of Sciences--for the series of works "Magnetic Spin Effects in Chemical Reactions," which were published in 1973-1984.

[Signed] Secretary of the CPSU Central Committee M. Gorbachev

Chairman of the USSR Council of Ministers N. Ryzhkov

Moscow, the Kremlin. 17 April 1986. No 463
CSO: 1814/263
7807

NOMINATIONS FOR 1986 UKRAINIAN SSR STATE PRIZES

Kiev PRAVDA UKRAINY in Russian 30 Jul 86 p 3

[Article: "From the Committee for Ukrainian SSR State Prizes in Science and Technology Attached to the Ukrainian SSR Council of Ministers"]

[Text] The Committee for Ukrainian SSR State Prizes in Science and Technology attached to the Ukrainian SSR Council of Ministers reports that the following works have been allowed to compete for the 1986 Ukrainian SSR State Prizes in Science and Technology:

1. Yuriy Nikolayevich Shevchenko, Igor Yakovlevich Amiro, Veniamin Dmitriyevich Kubenko, Anatoliy Tikhonovich Vasilenko, Vladimir Aleksandrovich Zarutskiy, Ivan Semenovich Chernyshenko, Kuzma Ivanovich Shnerenko, Ivan Vlasovich Prokhorenko, Valeriy Nikolayevich Chekhov, Viktor Nikolayevich Chekhov. The five-volume monograph "Metody rascheta obolochek" [Methods of Calculating Shells], which was published in 1980-1982.

Submitted by the Institute of Mechanics of the Ukrainian SSR Academy of Sciences.

2. Andrey Yevgenyevich Borovik, Klavdiy Veniaminovich Maslov, Yevgeniy Konstantinovich Sklyanin, Leon Armenovich Takhtadzhyan. The series of works "The Solution of the Problem of the Exact Integration of Nonlinear Equations of the Dynamics of Unidimensional Ferromagnets."

Submitted by the Physical Technical Institute of Low Temperatures of the Ukrainian SSR Academy of Sciences.

3. Vitold Pavlovich Fokin, Viktor Prokofyevich Shevchenko, Vladislav Yakovlevich Ruban, Tatyana Grigoryevna Drogal, Yuriy Ivanovich Kozak, Anatoliy Ivanovich Solyanik, Vladimir Anatolyevich Shirokov, Anatoliy Fedorovich Tutov, Boris Yakovlevich Brusilovskiy, Boris Andreyevich Voloboyev. "The Republic Automated System of the Management of the Development of Science and Technology in the Ukrainian SSR" (RASUNT USSR).

Submitted by the Main Scientific Research and Information-Computer Center of the Ukrainian SSR State Planning Committee.

4. Petr Grogoryevich Borzyak, Galina Andreyevna Katrich, Yuriy Fedorovich Komnik, Yuriy Aleksandrovich Kulyupin, Sergey Alekseyevich Nepiyko, Lev Samoylovich Palatnik, Boris Yakovlevich Pines, Oleg Georgiyevich Sarbey, Petr Mikhaylovich Tomchuk, Rostislav Dmitriyevich Fedorovich. The series of works "Scale Effects in Small Particles of a Solid."

Submitted by the Institute of Physics of the Ukrainian SSR Academy of Sciences.

5. Aleksandr Ilich Akhiyezer, Viktor Grigoryevich Baryakhtar, Kirill Borisovich Vlasov, Yel Markovich Ganapolskiy, Dmitriy Nikolayevich Makovetskiy, Sergey Vladimirovich Peletminskiy, Viktor Vasilyevich Tarasenko, Yevgeniy Akimovich Turov, Vladimir Grigoryevich Shavrov. The series of works "The Discovery and Study of the Dynamic Phenomena Connected With Phonon Interactions in Magnetic Crystals."

Submitted by the Institute of Radio Physics and Electronics of the Ukrainian SSR Academy of Sciences.

6. Ilya Yakovlevich Dekhtyar, Mikhail Aleksandrovich Krivoglaz, Ella Georgiyevna Madatova, Viktor Serafimovich Mikhalenkov, Sofiya Grigoryevna Sakharova, Adrian Anatolyevich Smirnov, Vladilen Ivanovich Silantyev, Rema Georgiyevna Fedchenko, Viktor Vasilyevich Dyakin, Aleksey Viktorovich Lyubchenko. The series of works "Positron Studies of the Structure of Solids."

Submitted by the Institute of Metal Physics of the Ukrainian SSR Academy of Sciences.

7. Ivan Prokhorovich Zapesochnyy, Otto Bartolomeyevich Shpenik, Ilya Sergeyevich Aleksakhin, Lyudvik Lyudvikovich Shimon, Vasiliy Vasilyevich Skubenich, Yakov Mikhaylovich Fogel, Adolf Grigoryevich Koval, Valeriy Timofeyevich Koppe, Galina Nikitovna Polyakova, Evelina Timofeyevna Verkhovtseva. The series of works "Elementary Processes of the Inelastic Interaction of Electrons With Atoms and Molecules of Atmospheric Gases."

Submitted by Uzhgorod State University.

8. Ivan Arsentyevich Sheka, Leonid Fomich Kozin, Andrey Georgiyevich Morachevskiy, Anatoliy Andreyevich Nikitin, Lidiya Stepanovna Novikova, Vladimir Grigoryevich Vivdyuk, Gennadiy Grigoryevich Kostrulev, Nikolay Vasilyevich Zhukotskiy. "The Physical Technical Principles, Technology, and Industrial Assimilation of the Production of Ultrapure Metals (Mercury, Cadmium, Zinc, Lead, Bismuth, Gallium, Indium, Thallium, Tellurium)."

Submitted by the Institute of General and Inorganic Chemistry of the Ukrainian SSR Academy of Sciences.

9. Aleksandr Vasilyevich Sandulyak, Vyacheslav Ivanovich Garashchenko, Oleg Yuryevich Korkhov, Nikolay Vasilyevich Yatskov. "New Equipment and Technology for the Magnetic Precipitation of Impurities of Liquids and Gases."

Submitted by the Ukrainian Institute of Engineers of Water Resources.

10. Gennadiy Kharlampiyevich Matsuka, Anna Valentinovna Yelskaya, Marina Iosifovna Kovalenko, Galina Viktorovna Ovcharenko, Mikhail Arsentyevich Tukalo, Olga Iosifovna Gudzera, Anna Dmitriyevna Yaremchuk, Irina Georgiyevna Vasilyeva, Aleksey Petrovich Soldatkin, Galina Viktorovna Turkovskaya. The series of works "The Structural Functional Principles of the Participation of Transfer RNA and Aminoacyl-tRNA-Synthetase in the Regulation of the Synthesis of Protein at the Level of Translation in Animals."

Submitted by the Institute of Molecular Biology and Genetics of the Ukrainian SSR Academy of Sciences.

11. Stanislav Aleksandrovich Kudinov, Nikolay Yevdokimovich Kucherenko, Mikhail Dmitriyevich Kurskiy, Margarita Konstantinovna Malysheva, Yemelyan Trofimovich Mikhaylenko, Galina Konstantinovna Stepankovskaya, Aleksey Nikolayevich Fedorov, Boris Aleksandrovich Tsudzevich. The series of works "Ion-Transporting Systems of Nerve and Muscular Tissues and Their Correction in the Clinic."

Submitted by the Institute of Biochemistry imeni A.V. Palladin of the Ukrainian SSR Academy of Sciences.

12. Yuriy Aleksandrovich Averin, Oleg Stepanovich Vyalov, Vasiliy Vasilyevich Glushko, Anatoliy Fedorovich Goncharuk, Fridrikh Ivanovich Zhukov, Vera Nikolayevna Zaytseva, Yuriy Mikhaylovich Koptyukh, Yaroslav Onufriyevich Kulchitskiy, Erik Aleksandrovich Lazarenko, Valentin Vladimirovich Naumenko. The series of works "The Tectonics and Metallogeny of the Soviet Carpathians."

Submitted by the Institute of Geochemistry and Mineral Physics of the Ukrainian SSR Academy of Sciences.

13. Boris Yevtikhiyevich Trinchuk, Ilya Vladimirovich Gorenshteyn, Igor Borisovich Kogan, Valentin Vasilyevich Kuzmenko, Ivan Vasilyevich Liptuga, Aleksandr Nikitovich Mikhaylyuchenko, Abdulla Yakubovich Romazanov. "The Development and Introduction of an Integrated System of the Management of Resources, Which Ensures High Growth Rates of Products Made From Saved Metal Without an Increase of the Number of Workers (On the Basis of the Experience of the Initiative of the Kislorodmash Scientific Production Association)."

Submitted by the Kislorodmash Scientific Production Association imeni 60-letiya Velikoy Oktyabrskoy sotsialisticheskoy revolyutsii.

14. Boris Ivanovich Gulyayev, Boris Aleksandrovich Mitrofanov, Mariya Gavrilovna Martsenyuk-Kukharuk, Grigoriy Petrovich Korneychuk, Aleksandr Vasilyevich Fesenko, Semen Petrovich Kovalchuk, Petr Naumovich Tomashpolskiy, Maksim Alekseyevich Buts, Leonid Terentyevich Sulima, Yuriy Aleksandrovich Yakovenko. "The Development and Introduction of a System of the Carbon Dioxide Top Dressing of Plants of Protected Ground With Catalytically Purified Flue Gases of Boiler Houses."

Submitted by the Institute of Physical Chemistry imeni L.V. Pisarzhevskiy of the Ukrainian SSR Academy of Sciences and the Ukrainian State Main Planning and Scientific Research Institute of the Ukrainian SSR State Agroindustrial Committee.

15. Mikhail Petrovich Pavlovskiy, Daniil Yulyanovich Krivchenya, Valeriya Nikolayevich Korotkiy, Susanna Nikolayevna Panchenko, Anatoliy Pavlovich Radzikhovskiy, Yevgeniy Borisovich Kolesnikov, Vladimir Viktorovich Skiba, Vladimir Yegorovich Medvedev, Nikolay Timofeyevich Kartel, Gleb Lvovich Orel. The series of works "The Development, Theoretical Substantiation, and Clinical Introduction of New Methods of the Operative Treatment, Detoxification, and Rehabilitation of Patients With Diseases of the Liver and Bile Ducts."

Submitted by the Kiev Scientific Research Institute of Clinical and Experimental Surgery.

16. Apollon Maksimovich Belous, Eduard Fedorovich Drizheruk, Yuriy Vladimirovich Kononov, Semen Semenovich Lavrik, Vladimir Iosifovich Lugovoy, Viktor Alekseyevich Moiseyev, Yuriy Stepanovich Parashchuk, Alla Aleksandrovna Tsutsayeva. The series of works "The Study of the Mechanisms of Damages by Cold and the Protection by Cold of Cells and the Development of Methods of Their Preservation for Use in Medical Practice."

Submitted by the Institute of Problems of Cryobiology and Cryomedicine of the Ukrainian SSR Academy of Sciences.

17. Aleksandr Vasilyevich Yakimov, Anatoliy Aleksandrovich Shepelev, Anatoliy Nikitovich Kolomayko, Valeriy Tikhonovich Chalyy, Sergey Mikhaylovich Malenkikh, Evnos Samvelovich Alikhanyan, Lev Petrovich Smirnov, Mikhail Davidovich Levin, Aleksandr Dmitriyevich Kurnosov, Anatoliy Aleksandrovich Skolota. "The Development and Industrial Introduction of a High-Performance Technology of Machining by Diamond Abrasive Tools With a Discontinuous Working Surface."

Submitted by Odessa Polytechnical Institute.

18. Valeriy Georgiyevich Krivenko, Ivan Leontyevich Lazebnyy, Ivan Korneyevich Golomovzyuk, Fedor Konstantinovich Porkhun, Iosif Zelikovich Genkin, Vladimir Borisovich Shlyapin, Vladimir Vasilyevich Lyadov, Viktor Mikhaylovich Kuznetsov, Filipp Ivanovich Peretrukhin, Aleksandr Grigoryevich Galinskiy. "The Development and Introduction of the Technology and Equipment for the Welding of Thermally Hardened Rails."

Submitted by the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences.

19. Vladimir Nikolayevich Bondarenko, Vadim Petrovich Gorshunov, Nikolay Vasilyevich Kruglyak, Aleksandr Petrovich Lysyuk, Iosif Gershovich Likholat, Leonid Rakhmilovich Tisnovskiy, Aleksandr Nikolayevich Karpus, Grigoriy Danilovich Nalivka, Vladimir Sidorovich Polishchuk. "The Perfection of the Design of Large Parts and Assemblies of Polymer-Processing Equipment for the

Purpose of Improving Its Technical Characteristics on the Basis of the Development and Introduction of Advanced Technological Processes."

Submitted by the Kiev Bolshevik Production Association of Polymer Machine Building.

20. Yuriy Vyacheslavovich Korniyenko, Vladimir Nikolayevich Dudinov, Yuriy Grigoryevich Shkuratov, Dmitriy Gennadiyevich Stankevich, Viktor Grigoryevich Parusimov, Anatoliy Antonovich Babichev. The series of works "The Analog and Digital Processing of Astronomical Images."

Submitted by the Institute of Radio Physics and Electronics of the Ukrainian SSR Academy of Sciences, Kharkov State University imeni A.M. Gorkiy, and the Main Astronomical Observatory of the Ukrainian SSR Academy of Sciences.

21. Anatoliy Ivanovich Kalmykov, Valentin Borisovich Yefimov, Yuriy Viktorovich Zakharov, Veniamin Izraylevich Zeldis, Veniamin Vladimirovich Igolkin, Vladimir Aleksandrovich Komyak, Aleksandr Sergeyevich Kurekin, Aleksandr Petrovich Pichugin, Petr Mikhaylovich Torchun, Valeriy Nikolayevich Tsymbal. "The Development of Radar Methods of the Study (Remote Sensing) of the Natural Environment of Earth From Aerospace Vehicles and Their Introduction."

Submitted by the Institute of Radio Physics and Electronics of the Ukrainian SSR Academy of Sciences.

22. Aleksandr Yevgenyevich Kravtsov, Marat Terentyevich Shpak, Mikhail Vladimirovich Fok, Mikhail Abramovich Reznikov, Viktor Iosifovich Pipa, Vladimir Aleksandrovich Dzhanibekov, Vladimir Dmitriyevich Leonov, Yevgeniy Aleksandrovich Sochilov. "The Study, Development, and Use in Microelectronic and Space Technology of Methods and Equipment of Nondestructive Flaw Detection on the Basis of the Electrotopographic Effect."

Submitted by the Institute of Physics of the Ukrainian SSR Academy of Sciences.

23. Aleksandr Aleksandrovich Kovalchuk, Valentin Yakovlevich Dubrovskiy, Lev Semenovich Lyakhovetskiy, Valeriy Semenovich Shkabatur, Naum Zuselevich Shor, Vladimir Alekseyevich Trubin, Vladimir Ivanovich Strizhak, Aleksandr Mikhaylovich Vaynzof, Valerian Romanovich Kucherenko. "The Development and Introduction of a System of the Optimum Designing and Use of the Capacities of Pipe Production."

Submitted by the Ukrainian State Institute for the Designing of Metallurgical Plants.

24. Lev Nazarovich Levchenko, Arkadiy Solomonovich Natapov, Semen Leonidovich Baskin, Oleg Vasilyevich Filonov, Viktor Vladimirovich Ostapenko, Gennadiy Anatolyevich Dyshkovets, Valeriy Stepanovich Baranov, Boris Nikolayevich Fridlyanov, Igor Nikolayevich Surikov, Vladimir Vasilyevich Parusov. "The Study, the Development of the Design, and the Assimilation of a High-Performance Industrial Technology of the Rolling of Effective Reinforcing

Sections of Small Cross-Sections, Which Ensure the Decrease of the Consumption of Metal in Construction."

Submitted by the Dnepropetrovsk Metallurgical Institute imeni L.I. Brezhnev.

25. Yevgeniy Pavlovich Dyban, Mikhail Valeryanovich Stradomskiy, Eleonora Yakovlevna Epik, Viktor Nikolayevich Klimenko, Yevgeniy Aleksandrovich Maksimov, Vitaliy Anatolyevich Asmalovskiy, Boris Dmitriyevich Bileka, Aleksandr Iustinovich Mazur, Svetlana Mikhaylovna Chepaskina, Viktor Yulyevich Khavin. The series of works "The Theoretical Principles and Practical Methods of the Development of Effective Systems of Heat Protection of High-Temperature Engines and Their Introduction in Power and Transport Machine Building."

Submitted by the Institute of Technical Thermal Physics of the Ukrainian SSR Academy of Sciences.

26. Vladimir Dmitriyevich Leporskiy, Eduard Pavlovich Slizskiy, Anatoliy Ivanovich Lishchenko, Nikolay Ilich Savenko, Nikolay Yustinovich Shcherba, Petr Anisimovich Voloshin, Ivan Vasilyevich Bruyev, Georgiy Sergeyevich Zagorovskiy, Aleksandr Nazarovich Korniyets, Arnold Borisovich Dyb. "The Development, Study, and Introduction of Advanced Technological Conditions for Compressor Stations on Main Gas Pipelines in Case of Short-Term Interruptions of Electric Power Supply."

Submitted by Kiev Polytechnical Institute imeni 60-letiya Velikoy Oktyabrskoy sotsialisticheskoy revolyutsii and the All-Union Industrial Association for Gas Production in the Ukrainian SSR.

27. Yevgeniy Petrovich Dubrova, Aleksandr Sergeyevich Gorodetskiy, Vadim Eduardovich Pavlovskiy-Litvinov, Anatoliy Antonovich Lyashchenko, Yuvinaliy Andreyevich Sarnatskiy, Anatoliy Konstantinovich Donets, Sergey Pavlovich Pavlov, Aleksandr Abramovich Drach, Igor Yakovlevich Okhota, Ivan Aleksandrovich Yanovich. "The Development and Extensive Introduction at Design Organizations of the Ukrainian SSR State Committee for Construction Affairs of Computer-Aided Design Systems of Objects of Construction, Which Ensure the Saving of Material and Manpower Resources in Capital Construction."

Submitted by the Ukrainian SSR State Committee for Construction Affairs.

II. Textbooks

1. Anatoliy Ivanovich Petrenko. "Osnovy postroyeniya sistem avtomatizirovannogo proyektirovaniya" [The Principles of the Construction of Computer-Aided Design Systems], a textbook for students of higher educational institutions (2d edition, "Vyshcha shkola", Kiev, 1985).

Submitted by the Ukrainian SSR Ministry of Higher and Secondary Specialized Education.

2. Dmitriy Fedorovich Skripnichenko. "Khirurgiya" [Surgery], a textbook for students of medical institutions (5th edition, "Vyshcha shkola", Kiev, 1984).

Submitted by the Ukrainian SSR Ministry of Higher and Secondary Specialized Education.

In publishing the list of works which have been allowed to compete for the 1986 Ukrainian SSR State Prizes in Science and Technology, the Committee appeals to scientific and scientific and technical societies, scientific institutions, enterprises, higher educational institutions, scientists and specialists, and the public at large to take part in the discussion of the listed works and to report their opinion on their content and the composition of the collectives of authors.

The names of the works and the compositions of the collectives of authors are being published, for the most part, in conformity with the representations and will be revised during the further discussion.

We ask that the opinions and remarks, as well as the materials of the public discussion of the works and their collectives of authors be sent by 1 October of this year to the address: 252021, Kiev-21, Ulitsa Kirova, 18, Room 3, the Committee for Ukrainian SSR State Prizes in Science and Technology attached to the Ukrainian SSR Council of Ministers.

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GENERAL

CHAZOV, BLOKHIN ON COSTS OF ARMS RACE

Sofia RABOTNICHESKO DELO in Bulgarian 15 Oct 86 p 2

[Report on Katya Karagyaurova interview with USSR Academicians Nikolay Blokhin and Yevgeniy Chazov on the occasion of their visit to Bulgaria, date and place not given]

[Text] The distinguished Soviet scientists Academician Nikolay Nikolayevich Blokhin and Academician Yevgeniy Ivanovich Chazov, who were elected foreign members of the Bulgarian Academy of Sciences, are presently visiting our country.

Academician Blokhin was born in 1912. He participated in the Great Patriotic War as a surgeon. In 1952 he became director of the Institute of Experimental and Chemical Cancer Research, and in 1975 he was appointed director of the All-Union Cancer Research Center at the USSR Academy of Medical Sciences. Since 1977 he has been president of the USSR Academy of Medical Sciences.

Academician Chazov was born in 1929. He has been USSR Deputy Minister of Health since 1978. He is the founder of Soviet theoretical cardiology. He is winner of the Lenin Prize and of the Soviet State Prize.

Both Soviet scientists are honorary members of numerous international academies. They are popular not only because of their involvement in public affairs. They are deputies of the USSR Supreme Soviet, Heroes of Socialist Labor. Academician Chazov is cochairman of the International Movement of Physicians for the Prevention of Nuclear War.

How will the disarmament struggle and the struggle to avert nuclear was develop following the unsuccessful Reykjavik meeting--this was the main subject of the interview with Katya Karagyaurova, a representative of our editorial board, had with the distinguished guests.

[Academician Blokhin] A historic opportunity was missed to make the transition from the arms race to the destruction of nuclear reserves. However, we will multiply our efforts to achieve an agreement on the limitation of nuclear arms. It is our wish that by the end of the century the earth will be free of such weapons. We will actively work for this cause.

The stands of the Soviet leadership are well known and enjoy popularity throughout the world. In communicating with scientists from numerous countries, we know that people today ask themselves the question--why have there not been any nuclear explosions in the USSR for over a year, while nuclear tests continue in the United States? There is no other answer to this question, than the one that the leadership in the United States is subordinated to the military-industrial complex and cannot accomplish the step it would like to embark upon, and which all peoples on the earth are striving for. The physicians are in the forefront of the struggle for peace, because they are studying the results of Hiroshima and Nagasaki, despite the fact that weapons were less sophisticated at that time. However, we can understand how terrifying they are. There can be no question of a locally restricted war, since it would inevitably spread all over the globe.

[Academician Chazov] In the clinics and operating rooms we struggle to rescue one human life. We are concerned for every individual. But in this case we are talking about saving all mankind. We know that, in this difficult situation, we should not remain inactive. On the contrary--we must even intensify our efforts. We are obliged to intensify our work. The physicians movement has a broad program of action. A great confidence of European medical doctors will take place in Madrid, in October. Meetings in Havana and New Zealand will follow it.

We are convinced that common sense will prevail. In one of our documents the following statement is included: "Wars are created by men, but man's common sense can prevent wars." We believe in common sense. Everyone should be aware of what a nuclear war is like, and actively contribute to averting it. There should be no indifferent people in this world. This is not only so because a real danger exists, but also because rearmament requires tremendous financial means to the detriment of social welfare. In this world 5 million children die every year because they have not been vaccinated. To vaccinate them costs $260 million. A nuclear submarine, however, costs $1 billion. We can calculate how much we would gain if we were to use these means for medicine.

It has been estimated that in case of nuclear war, 300 million physicians will be needed for first aid and 100 million nurses will also be required for the same purpose. There are 3.5 million physicians and 7.5 million nurses in the world today. Such figures demonstrate the hopelessness of the situation if such a disaster were to occur.

The most important question today is to establish mutual confidence among the peoples. The prevailing influence of this new way of thinking in political life is the main task of our epoch.

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DEVELOPMENT OF MACHINERY FOR CONSTRUCTION INDUSTRY

Moscow PRAVDA in Russian 21 Aug 86 p 2

[Article by Doctor of Technical Sciences Kh. Vorobyev under the rubric "Accelerate Scientific and Technical Progress": "Machines for the Sector"; first paragraph is PRAVDA introduction]

[Text] Every construction project begins with construction materials. While they originate at the scientific laboratories and industrial installations of the modern construction industry. The demand for materials today is large and diverse. Both at the giant construction site of the largest hydroelectric power plant and at the modest dacha plot they should satisfy the requirements of any technology. However, the construction of a plant building, a city microrayon, a sovkhoz settlement, a farm, a brigade field camp, and a sports field dictates its own approach both to the quality and to the technological feasibility of construction parts and the reliability and maneuverability of machinery.

In recent years many academic and sectorial institutes have been demonstrating convincingly the advantages of the joint elaboration of scientific problems--from the organization of theoretical research to the practical assimilation of advanced industrial technologies and units. It is also possible to cite many such examples in our sector.

For example, not that long ago ceramic facing tile was in great shortage. Now at stores there is a different picture--both tile is encountered more often and its appearance is more diverse in pattern and color. The buildings decorated with it look more cheerful. I would not dare to say that this is owing to the revolution in tile production, which was made by scientists of the Scientific Research Institute of Construction Ceramics jointly with designers and engineers of related organizations and enterprises.

Or there is such a problem, which recently was still "sticky," as the cutting of cellular concrete. It takes a long time and is inconvenient and awkward to make out of it wall items with a mold, casting each individual slab. We did not learn immediately to cut it, as they have already begun abroad. This was an appreciable hindrance in the development of industrial methods of construction. Specialists of the Scientific Research and Design Institute of Silica Concrete, who developed jointly with the All-Union Scientific Research

Institute of Construction Materials and Components a domestic vibration cutting technology which sharply increases both the output of the necessary items and their strength, eliminated it.

An original domestic technology of the production of extruded asbestos cement items and the necessary equipment for it were developed by the VNIIproyektasbotsement and the All-Union Scientific Research Institute of Construction Materials and Components imeni P.P. Budnikov jointly with designers of the Asbotsemmash. This increased the production of large-tonnage parts which make up any building.

Highly mechanized and automated lines for the production of concrete and reinforced concrete items have appeared. The simplicity, compactness, and mobility of such a line for the production of concrete masonry blocks, for example, are making it possible to make it both permanent and mobile, to build without capital structures, and to use local materials. All this is especially valuable in rural areas.

And still the overall low technical level of our sector is perceptible precisely against the background of such achievements. Working conditions still continue to remain physically difficult, it is dusty and hot in the shops. More than 40 percent of the operations are performed by hand. The quality of construction items frequently is extremely demoralizing. And here the fact that tens of sectorial institutes and orgtekhstroms, which unite about 50,000 scientists and engineering and technical personnel, operate in the system of the USSR Ministry of the Construction Materials Industry, is perceived as a direct reproach.

The detachment is large. How is one to raise its efficiency to the heights which have been prescribed by the present?

The characteristic feature of the most advanced scientific organizations is plain to see. Their structure envisages a continuous chain of actions. The research process engineers improve the processes of the production of materials and items. Then the designers develop machines and units for the implementation of the developed processes. Close by there are pilot machine building bases for the production of prototypes of new equipment. In a number of cases all this is supported by subdivisions for its installation and start-up and adjustment work.

This, strictly speaking, is also comprehensiveness. It is simple, logical, and effective.

Such logic is also violated at many sectorial institutes of the construction industry. What is one to say about outlying institutes, if even the State All-Union Scientific Research Institute of the Cement Industry, the main institute in the sector, in practice is not dealing with the instrumental execution of its own technological ideas? The quite strong technological subdivisions do not have enough design and machine building subdivisions, which could embody ideas in models and pilot and experimental plants. The development of powerful and metal-consuming cement equipment is carried out at the specialized All-Union Scientific Research Institute of Cement Machinery of

the Ministry of Construction, Road, and Municipal Machine Building. Owing to the indicated reasons "our" cement industry workers cannot issue to it, or else directly to the Volgotsemtyazhmash Plant assignments on the production of equipment for new processes. Many rather good ideas are hanging in the air.

However paradoxical it is, the construction industry does not have at all its own machine building, in contrast, for example, to the coal industry, which in accordance with its own needs designs and produces machines.

Now workers (mainly women) annually in the process of production restack several times by hand, often at a temperature of 50 degrees Celsius, on the order of 30 billion clay bricks. In response there is a string of departmental excuses. The machine builders will allude to the electrical engineers, who have not supplied the necessary geared motors, to the lack of hydraulic drives, and so on. But the leading institutes, design bureaus, and enterprises of the sector have devised and are now developing quite advanced automatic layers of silica and clay brick and other manipulators and robots. Only a means of supplying production with them has not been found.

The truth: the achievements of science mainly are realized through the products of machine building and instrument making, is well known. But in order to embody an idea in metal, the efforts of design services and specialists in equipment building and automation equipment are necessary. At our sectorial institutes and laboratories, according to rough estimates, there are from 5 to 10 process engineers per designer. And it is not surprising that many, even important technological suggestions cannot be embodied not just in equipment, but even in drawings.

But if sectorial institutes did want to remedy the matter, they would hardly succeed in this. Where is one to get developers of equipment, heat engineering units, and means of automatic control, if the network of higher educational institutions and tekhnikums for tens of years has continued through inertia to train thousands of research specialists in the chemistry and technology of silicates, but incomparably fewer technician-mechanics, mechanical engineers, and designers?

In spite of the fact that the process of producing the majority of construction materials involves firing, melting, hardening, and drying, not one higher educational institution of the country is training heat engineers for this sector. The only chair in the country, which was organized for this purpose more than a quarter century ago at the Moscow Institute of Chemical Machine Building, has been eliminated. As a result power engineers, process engineers, and engineers of any other specialties, only not characteristic specialists, are operating complex high-temperature equipment. Hence, too, the design imperfection of our heating units, the enormous excessive consumption of fuel in case of their operation, in short, the lag of all heat engineering.

The appearance of new machines in sectorial science should also be encouraged in every possible way by the Higher Certification Commission of the USSR Council of Ministers (VAK). Indeed, at first after its transformation the demands on dissertations increased, those of them, which were of practical

sectorial and national economic importance, received a high rating. However, these principles then began to be eroded. In recent years it has been possible to count on one's fingers the candidate and doctoral dissertations which offer new materials, processes, machines, production lines, and so on. Moreover, it is not that rarely possible to see a mechanical engineer or automatic machine operator defend a dissertation on the chemistry or technology of silicates. In accordance with his specialty he must, as a rule, propose an original process, machine, or unit, study their parameters on a model, and produce a prototype. How much time and effort are required for this! Is it not simpler for the same designer, engineer, or heat engineer following the example of other process engineers to suggest several formulas of charges, which differ from each other by the proportions of the percentages of various additives, and after pilot testing to make a defense in the same technical specialty and without testing in a chemical specialty?

The party is attaching enormous importance to the improvement of the entire mechanism of construction. The thorough organizational reform of this all-encompassing sector has begun. But it is possible to bring it to a logical conclusion, to the appearance of "the final product," that is, plants, residential districts, and social, personal service, and cultural facilities, which have been built quickly and with good quality, only by relying on the modern achievements of science and the advanced equipment, to which it has given rise.

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BIOGRAPHICAL INFORMATION

ASHRAF ABDULOVICH ALI-ZADE OBITUARY

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH I GEOLOGICHESKIKH NAUK in Russian No 2, Feb 86 pp 110-111

[Article under the rubric "The Losses of Science": "To the Memory of a Scientist (On the 75th Anniversary of Academician A.A. Ali-zade)"]

[Text] Academician of the Azerbaijan SSR Academy of Sciences Ashraf Abdulovich Ali-zade, a well-known Soviet geology scholar, was born on 24 April 1911 in the city of Shemakha in Azerbaijan.

His childhood and youth coincided with the years of the emergence of Soviet power in Azerbaijan. The young republic needed specialists for various sectors of the national economy. Therefore, Ali-zade, just as hundreds of people of his own age, studied themselves and helped to raise the new generation. A.A. Ali-zade carried this lofty moral principle through his entire life.

In 1924 Ashraf Abdulovich graduated from a school of the first degree in Baku and continued his studies at a secondary pedagogical school, simultaneously teaching Russian in the Azerbaijan school and Azeri in the Russian school. Then he was a statistician in the Central Statistical Administration, chief of a primary school, and an instructor of the campaign against illiteracy. In 1930 he enrolled in Tbilisi Polytechnical Institute. But soon he left it and enrolled in the Geological Prospecting Faculty of the Azerbaijan Institute of Petroleum. The love for his native land and its beauty, which arose during the years of his youth, determined his path of life into large-scale geology. From 1930 to 1935 during his studies at the institute he simultaneously worked as a culture soldier and taught at a geological prospecting tekhnikum, was a geologist in field detachments, in which he carried out topographic photography, and a correspondent of BAKINSKIY RABOCHIY, and performed scientific research work under the supervision of the very prominent scientists S.A. Kovalevskiy, V.V. Bogachev, and others. The result of this work was the discovery of the large promising petroleum- and gas-bearing Kaynardzhinskiy Fold, which both was his graduation project and served as the beginning of many years of scientific studies of petroleum- and gas-bearing lands and numerous developments and discoveries.

After graduating from the institute A.A. Ali-zade worked in the Aznefterazvedka Trust, having begun as an ordinary geologist, and became its manager. At this time he prepared tens of sites for deep drilling and organized exploratory and prospecting operations throughout Azerbaijan. Special organizing abilities made it possible to nominate A.A. Ali-zade for party work first as secretary of the Baku City Soviet, then as secretary of the Azerbaijan CP Central Committee.

During the years of the Great Patriotic War Ali-zade performed fruitful scientific, practical, and organizing work, for which in 1943 he was awarded the USSR State Prize.

An important scientific achievement of those years was the discovery and the geological substantiation of the presence of petroleum and gas in the Maykop formation of Azerbaijan. During those years his candidate dissertation was defended and the degree of doctor of geological mineralogical sciences was awarded.

In 1945 A.A. Ali-zade among 15 prominent scientists was a founder of the republic Academy of Sciences and was confirmed in the title of full member of the academy.

During the postwar period Ashraf Abdulovich was in charge of the Azerbaijan Petroleum Association and the Aznefterazvedka Association. For the development of the principles and the invention of a small perforator of petroleum formations the scientist was again awarded the USSR State Prize.

After 1948 Academician A.A. Ali-zade linked his fate with Turkmenistan, working first as chief engineer and chief of a laboratory of the Turkmen Affiliate of the Azerbaijan Scientific Research Institute of Petroleum Extraction, then as chief of a chair of the Turkmen State University and chief of a sector of the Institute of Geology of the Turkmen SSR Academy of Sciences.

The move of A.A. Ali-zade to Turkmenistan coincided with the time of the placement into operation of the famous Kum-Dag Petroleum-Bearing Area. The discovery of Kum-Dag marked the beginning of the intensive increase of the search for and prospecting of petroleum and gas deposits and the expansion of scientific research, which, in turn, required the training of highly skilled engineers.

The prominent scientist in the field of petroleum and gas geology and a good expert in the geology of the Caucasus and the Southern Caspian found in Turkmenistan an abundant field of activity, for the urgency of the moment and the plans and prospects of the development of the petroleum and gas industry of the republic required the maximum efforts and knowledge of not only the scientific principles of the sector, but also the practice of exploratory and prospecting work.

The first scientific generalization of A.A. Ali-zade with respect to Turkmenistan on the occurrence of Pliocene deposits of the Western Turkmen Depression--bearers of petroleum and gas reservoirs--attracted attention by

the comprehensive approach to the study of the petroleum- and gas-bearing strata of large regions. This generalization, which was published in 1951 in the journal IZVESTIYA TFAN TSSR, became a program work of the scientist and subsequently an important direction of science and practice.

In Turkmenistan A.A. Ali-zade, along with basic scientific research in the field of petroleum and gas geology, stratigraphy, and paleontology, organized the first geology faculty in the republic at the Turkmen State University.

His talent as a teacher, educator, and organized was revealed completely at the Turkmen State University and at the Institute of Geology of the Turkmen SSR Academy of Sciences.

He began basic research in the study of the tectonics and stratigraphy of petroleum and gas strata and organized the first geology chair in the republic and the first sector of the geology of petroleum and gas in the system of the Academy of Sciences. Having organized the first geology faculty in the republic, Ali-zade was able to enlist in teaching such well-known geologists as Yu.N. Godin, P.I. Kalugin, K.K. Mashrykov, D.A. Agalarova, Kh.M. Mamedov, N.S. Rozhok, V.V. Semeovich, and others. The faculty trained petroleum geologists and geophysicists, specialists in engineering geology and the working of petroleum and gas deposits. Its founding marked the beginning of the technical faculty of the university, on the basis of which the Turkmen Polytechnical Institute was subsequently organized.

Under the supervision of Academician A.A. Ali-zade and with his scientific and procedural assistance an entire pleiad of geology scholars of Turkmenistan and doctors and candidates of sciences arose. Being in charge for long years of the sectorial petroleum institute, the Azerbaijan Scientific Research and Planning Institute of the Petroleum Industry, he aided the formation of the Turkmen Scientific Research and Planning Institute of the Petroleum Industry and the training of its personnel.

A.A. Ali-zade published more than 60 scientific articles and 8 monographs on studies of Turkmenistan, among them are "Akchagyl Turkmenistana" [Akchagyl of Turkmenistan], "Zemlya i zemletryaseniya" [The Land and Earthquakes], "Neft i yeye proiskhozhdeniye" [Petroleum and Its Origin]--works which were devoted to the results and prospects of studies of our region and to the development of its mineral raw material resources.

The Communist Party and the Government of the Turkmen SSR rated highly the activity of A.A. Ali-zade in Turkmenistan, having conferred on him in 1971 the honorary title "Honored Figure of Science and Technology of the Turkmen SSR."

The 75th anniversary of the birth of A.A. Ali-zade was on 24 April 1986, he devoted 55 of those year to the noble labor of an educator and teacher, an experienced worker and organizer.

A prominent theoretical and practical scientist, organizer, and educator, Ali-zade published more than 400 scientific articles and recommendations and more than 30 monographs. During his impressive life, which was filled with quests and accomplishments, he substantiated scientifically tens of directions in

geology and trained hundreds of specialists. Under his scientific supervision more than 60 people defended doctoral and candidate dissertations.

The Communist Party and Soviet Government rated highly the services of Academician A.A. Ali-zade. He was awarded two Orders of Lenin, the Order of Labor Red Banner, and many medals, he was twice awarded the title of USSR State Prize winner, and was an honored figure of science and technology of the Turkmen SSR and honored petroleum industry worker of the USSR.

A.A. Ali-zade left a large scientific legacy. His basic scientific developments, meaningful and rousing speeches and reports, heart-to-heart conversations, and strict orders will for a long time to come excite the minds of those who are continuing his work.

[Signed] N.O. Nazarov, Ya.A. Khodzhakuliyev, K.N. Amanniyazov, O.A. Odekov, M.A. Rotko, O. Torayev, A.A. Kuzmin, N. Mamiyesenov, A. Tuvakov, T.M. Lapteva, A.V. Dmitriyev, A.B. Perengliyev, S. Amanov, A. Nigarov, N. Nurmashev

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